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New Species of the Genus Mimulus.

M. MINTHODES. Akin to *M. ringens*, but stem wing-angled much as in *M. alatus*, also the leaves lanceolate, narrowed at both ends and short-petioled, the petiole winged, the margins of all leaves lightly crenate-serrate: peduncles long, surpassing the foliage: calyx-teeth subulate, aristate-acuminate.

Rare or local in the southern United States, where *M. ringens* is also widely dispersed; differing from that by its wing-angled stem and exactly lanceolate foliage, while from *M. alatus* it is distinguished by its long peduncles and subulate calyx-teeth. The type specimens are in U. S. Herb. and were collected at Birmingham, Ala., Aug., 1888. Others quite like them, but younger, were gathered at Rome, Georgia, in the same year.

M. ACUTANGULUS. Allied to *M. ringens*, and with similarly spatulate-lanceolate or oblong-lanceolate foliage lightly appressed serrate, but stem sharply angled, the fruiting calyx very short and thick, its teeth short, abruptly aristate-pointed above a deltoid base, also erect, not converging over the capsule like those of *M. ringens*.

A northwestern type which, despite its short erect calyx-teeth and somewhat angular stem, has no marked character in common with *M. alatus*. The type specimens in U. S. Herb. are from Crow Wing County, in central Minnesota, J. H. Sandberg, 19 Aug. 1891. *M. ringens* itself appears to be common in Minnesota.

I next subjoin a few segregates of the group of which *M. cardinalis* is typical. Indeed, all the forms here brought to notice have been carelessly labelled and distributed for that

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species. Everywhere in California and northward the deviations from the type seem best treated as marked varieties, or sub-species; but in Arizona, and southward in Mexico, all the forms have quadrangular stems, as well as a different type of foliage; with also some other definitely specific characters.

M. CARDINALIS, var. GRISEUS. Stems very stout, but weak and decumbent, much branched, grayish-hoary throughout, but especially as to stem, branches and peduncles, with a villous and somewhat viscid pubescence: leaves broadly oval, closely sessile, sparsely dentate with coarse triangular teeth, the intervals between these teeth denticulate.

On stream banks of Santa Catalina Island, off the coast of California, May, 1896, Blanche Trask.

M. CARDINALIS, var. RIGENS. Stems rather slender, perfectly terete, rigidly upright from roots not very obviously perennial: leaves numerous, ascending, not large, closely evenly and sharply dentate; peduncles rigid, of twice the length of the leaves: calyx rather short, its tube marked with fine red-purple dots.

Neighborhood of San Bernardino, in arid southern California; collected by S. B. Parish, July, 1896; in U. S. Herb. under his number 4189. It is in marked contrast with the far northern plant of cool mountain shades in a number of particulars.

M. CARDINALIS, var. EXSUL. Stems long, stout, decumbent or reclining, terete, densely leafy; leaves small for the plant, widely spreading, oval above a spatulate base, sessile, auricled-clasping, rather obtuse, not dentate, only lightly serrate-toothed, both faces softly viscid-pubescent: calyx short, its teeth deltoid and shortly acuminate: tube of corolla not exserted.

Inhabits the hot and arid island of Cedros off the coast of Mexico. Coll. Edw. Palmer, March, 1889, n. 681 as in U. S. Herb.

M. VERBENACEUS. Stems not stout, obtusely 4-angled, decumbent, 10 to 16 inches high, simple, densely leafy,

usually flowering at summit only; pubescence scanty, villous: leaves thin, elongated, elliptical and saliently as well as very regularly dentate above a spatulate and entire basal part, sessile by a subcordate but not dilated base: calyx villous, its teeth deltoid but with subulate tip: corolla with long tube exserted from the calyx by half its length.

Wet rocks above Clear Creek, Camp Verde, middle Arizona, J. W. Toumey, Aug. 1891, as in U. S. Herb.

M. LUGENS. Stems upright, rather slender, very distinctly 4-angled, lightly villous-pubescent: leaves elongated, the lower almost oblanceolate, the floral rhombic-lanceolate, all acute, saliently and closely serrate-toothed, the upper face marked in the middle by a large somewhat triangular dark-brown or blackish spot: peduncles slender, 3 or 4 inches long, twice the length of the leaves: folds of the calyx wholly dark-colored, as also the triangular-subulate teeth: corolla-tube of more than twice the length of the calyx.

Fort Huachuca, southern Arizona, Edward Palmer, 1890, n. 441 as in U. S. Herb. Also the same, by the same, from the Sierra de los Alamos on the Mexican side of the international boundary, in the same year.

M. RUPESTRIS. Stems slender, branching, 4-angled, largely prostrate, rooting at many of the nodes: leaves small, narrow, mostly elliptical, 3-nerved, closely, saliently and almost pectinately serrate-dentate: pedicels very slender, not equalling the leaves: calyx thin, its teeth triangular-lanceolate: corolla small, elongated, its tube twice the length of the calyx.

State of Morelos, Mexico, on wet cliffs at 7,500 feet on the Sierra de Tepoxtlan, C. G. Pringle, 6 May, 1900; his n. 8348 as in U. S. Herb. There is a fragment of something quite different mounted on one corner of the sheet.

The following are of the alliance that is headed by the *Mimulus luteus* of South America:

M. EROSUS. Annual, stoutish, 5 to 8 inches high, obscurely and obtusely 4-angled, rather short-jointed and more or less geniculate but not procumbent: leaves small, suborbicular or subreniform above a broadly cuneate petiolar base, the margins of all erose to strongly erose-dentate: fruiting pedicels of twice the length of leaves, filiform but firm: fruiting calyx strongly bilabiate and closed, coarsely purple-dotted: corolla of twice the length of the calyx, with long-exserted tube and small limb.

Santa Agneda, Lower California, Edw. Palmer, 1890, n. 233 as in U. S. Herb.

M. PALLENS. Annual, erect, very slender, 3 to 6 inches high, dull-green and glaucescent: leaves small, in few pairs and remote, very thin, oval to suborbicular, the upper broader and sessile, the lower narrower and on rather long winged petioles, all, even the petiolate ones, connate at the very base, some subentire, others toothed slightly; pedicels elongated, filiform: corollas clear yellow, large for the plant: fruiting calyx oval, closed by the usual folding of the segments; these all obtuse.

Vicinity of Durango, Mexico, Edw. Palmer, 1896; his n. 55, as in U. S. Herb.

M. PUBERULUS. Greene, in Rydb. Fl. Col. 311 (1906). Stems upright, terete, ½ to 1 foot high, branching, viscidly hirtellous or at least viscid-puberulent throughout: leaves not large, the lower obovate, spatulate at base, upper oval or ovate, sessile, all more or less and variously toothed: corollas large for the plant, 1 inch long, yellow; pedicels very short, not equalling the mature calyx, this oval, with uppermost tooth very large and prominent.

Type in my own herbarium from Pagosa Springs, Colo., by C. F. Baker, 27 July, 1899.

M. LONGULUS. Annual, slender, suberect, often a foot high or more, simple, glabrous, glaucescent, sparsely leafy and few-flowered, stem obtusely quadrangular, the lower internodes commonly 8 inches long: leaves small for the plant, orbi-

cular to round-reniform, denticulate: corolla minute, pale-yellow; calyx accrescent, in maturity approaching a half-inch long, the teeth unequal, little connivent.

Margins of spring pools that in summer have gone dry, in low meadows along the Humboldt River, at Deeth, Nevada, 26 July, 1896; collected only by the writer.

The species can only be compared with my *M. Hallii* of Colorado; and that is low, with rather crowded leaves and flowers; has also a calyx with much more unequal teeth and these closely connivent.

M. MINUSCULUS. Small delicate perennial 1 to 3 inches high from slender subterranean rootstocks, the whole plant more or less sparsely and minutely hispid-hirtellous: leaves thin, ovate, saliently few-toothed, subsessile, barely ½ inch long: flowers large for the plant, in the smaller 1 only and as if terminal, in the larger 2 or 3, on upright pedicels 1 inch long or more; calyx with 1 large and prominent and 4 very short teeth, all triangular; corolla large, ¾ inch long, light-yellow.

South Fork of Kern River, Calif., at 8,200 feet, J. T. Rothrock, 1875, n. 312 as in U. S. Herb.

M. CLEMENTINUS. Annual, with slender sharply 4-angled stems leafy and flowering throughout, all after the manner of *M. nasutus*, the corollas as small, but foliage different, the leaves simply and only slightly toothed, the lower with short winged petioles, the upper sessile: fruiting calyx obliquely round-ovate, the teeth subequal, that is, the upper one hardly prominent beyond the others.

San Clemente Island, off the coast of southern California, June, 1903, Blanche Trask. Type in U. S. Herb.

M. CORDATUS. Annual, a foot high, firmly erect, not slender, leafy mostly near the base, internodes of the obtusely 4-angled stem 2 inches long or more, flowers racemosely congested near the summit: leaves purplish, cordate, lightly dentate, an inch long, on flattened petioles of equal length, the few cauline smaller and subsessile, bracts of the raceme small, closely sessile: corollas ½ inch long, yellow, not dotted:

fruiting calyx on a slender pedicel of about its own length, of round-oval outline save as modified by the large and prominent triangular uppermost lobe or tooth.

Bear Mountain, near Silver City, New Mexico, 24 April, 1903, O. B. Metcalfe, a part of his n. 28 as in U. S. Herb., the other specimens under that distribution number being of a very different species. The present plant has some points notably recalling the Californian *M. nasutus*. Apparently the same is T. E. Wilcox's n. 31 from Fort Huachuca, Ariz., 1894, in flower only.

M. CUSPIDATUS. Of the height of *M. nasutus*, stems as quadrangular but more slender, with longer internodes and fewer leaves and flowers; herbage not reddened but pale-green and glaucescent; lower face of foliage more or less sparsely setulose-hairy, otherwise glabrous: leaves of suborbicular outline, the lowest on long and slender petioles, the lower and middle cauline with a merely spatulate to broadly cuneate base, these and the closely sessile bracts above them cuneate, all sparsely dentate and plainly cuspidate-pointed: pedicels slender, shorter than the calyx, this with not very prominent upper lobe: corolla small as in *M. nasutus*.

Known only as collected in wet shades among rocks along the upper Stanislaus River, California, by the writer, late in June, 1889.

M. PROCERUS. Stout, upright, presumably a yard high, the large terminal racemes alone a foot long, in every part hirtellous-puberulent: leaves below the inflorescence as far as known round-oval, petiolate, all the floral sessile, broader than long, the lower of these closely, deeply and almost pectinately dentate, the upper much reduced and entire: fruiting pedicels stout, ascending, much longer than the very large calyces, these broadly oblique-oval, ¾ inch long, more than ½ inch wide, their teeth large, short and blunt: corolla yellow, large, but not so in due proportion to the plant.

Santa Lucia Mountains, California, R. H. Plaskett, June, 1898, n. 156, as in my herbarium.

M. PETIOLARIS. Perennial, upright, rather slender, more than a foot high, glabrous except as to upper part of inflorescence, all the foliage elongated and rather long-petiolate, only the floral bracts sessile: leaves 3 to 5 inches long including the petiole, blades oval to lanceolate, mostly tapering to the petiole, acutish or obtuse, saliently and doubly dentate: raceme simple, lax, pedicels slender, elongated: corollas smallish, ¾ inch long, yellow: mature calyx unknown.

Argus Mountains, Inyo Co., Calif., Apr., 1891. Coville & Funston, n. 740 as in U. S. Herb. Remarkable for long narrow long-stalked leaves.

M. VERONICIFOLIUS. Middle-sized perrennial species, suberect from a decumbent base, sparingly leafy, glabrous as to the basal parts, at summit minutely puberulent: lowest leaves obovate, petiolate, the upper sessile, ovate, all serrate-dentate: flowers mostly 2 only, occasionally but one, large, long-pedicellate; calyx-teeth very unequal, the upper very large, obtuse; corolla very large, yellow.

At 5,000 feet in the Olympic Mountains, Washington, C. V. Piper, Aug., 1895; n. 2177 as in my herbarium.

Of the group of the tufted alpine, perennial, to which the Californian *M. implexus* belongs; differing from that by its veronica-like foliage and excessively large corollas, these 2 inches long and nearly 1½ inches wide at the orifice. They are perhaps the largest in the genus.

M. LUCENS. Akin to *M. implexus*, differing by much more slender stems which are weak and decumbent; leaves exactly ovate, truncate or subcordate at base, of such delicately succulent texture as to be clearly translucent when dried under pressure: calyx sparsely and finely villous.

Along rivulets in deep woods of the Powder River Mountains, Oregon, C. V. Piper, Aug., 1896, nn. 2518, 2519 as in my herbarium.

I myself once identified this for Mr. Piper as *M. implexus*, but that was done too inconsiderately. It is as large a plant, but of a totally different anatomy, its herbage, though fleshy,

being of an extremely delicate and almost fibreless tissue, the leaves when dry being as translucent as a delicate green sea-weed. It is, of course, a plant widely separated from the other geographically and ecologically.

New Western Asteraceae.

ASTER HALOPHILUS. Stems slender, decumbent, ½ to 1 foot high, sparingly strigulose under a lens, leafy to above the middle, racemose-panicled at summit: leaves rather crowded, oblong-linear, entire acute, green and glabrous except as to the serrulate-scabrous margin, all one-nerved, deflexed: heads middle-sized; involucre turbinate, much imbricated, with scales glabrous and glandless: rays pale violet.

Salt marshes about Beck's Hot Springs, Utah, at 4,500 ft., 6 Sept., 1906, A. O. Garrett. In foliage and habit as well as size reminding one of *A. campestris*, but not closely related to that, the involucre being in every way different, and more like that of *A. adscendens*.

ASTER LEUCOPSIS. Rather slender, rigid, 1 to 2 feet high, decumbent at base, racemose to subpaniculate from the middle; plant whitish with bloom, very sparsely scabrous, the margins of the lance-linear entire leaves strongly serrulate-scabrous: pedicels of the many middle-sized heads with many spreading linear bracts; involucre turbinate, closely imbricated, the green tips of the scales conspicuous on a ground of white: rays not large, pale violet.

Along irrigating ditches in the vicinity of Salt Lake City, Utah, very common. Here described from specimens by A. O. Garrett, 5 Sept., 1905.

ERIGERON MINUSCULUS. Low cespitose perennial with muti-cipitous short caudex surmounting a stout tap root; flowering branches slender and wiry, only 2 or 3 inches high, monoce-phalous, leafy-bracted; basal leaves linear, an inch long,

upright, firm, green and glabrous like the stems, perfectly entire: involucres small, campanulate, the bracts unequal and in two ranks, densely glandular-scaberulous, acute: rays neither numerous nor narrow, deep bluish-purple; disk-flowers also not very numerous.

Clefts of rocks in Big Cottonwood Cañon, Salt Lake Co., Utah, 24 Aug., 1906, collected and communicated by A. O. Garrett. Ambiguous as to the genus, the glabrous stems and foliage and few broad rays recalling *Aster;* but the disk-corollas, etc., are those of the genus *Erigeron*.

ERIGERON MENDOCINUS. Tufted and rigid perennial a foot high, the stems decumbent at base, simple, leafy up to the inflorescence of about 3 large heads; leaves spatulate-linear, the lower and larger 2 inches long, acute, nearly glabrous except as marginally beset with stiff hairs abruptly bent upwards from the base: heads 1½ inches broad from tip to tip of the rich lilac rays; involucre broadly hemispherical, its bracts in about 3 series; strigosely pubescent: achenes smooth, sparsely strigose.

Big River, Mendocino Co., Calif., July, 1903, Jas. McMurphy, n. 353. An exceedingly showy and beautiful member of that Californian group of Erigerons to which *E. Hartwegi* and *E. Breweri* belong.

PYRROCOMA CALENDULACEA. Stout, with several monocephalous bracted and subscapiform stems hardly surpassing the foliage, the whole only 5 or 6 inches high: leaves mostly broadly oblanceolate, subspatulately tapering to a petiole, all entire, of thinnish texture, glabrous or nearly so; cauline short, lanceolate, sessile, and like the upper part of the stem more or less villous-arachnoid: involucres nearly hemispherical, ¾ inch broad, not as high, bracts many but subequal, oblong-linear, acute, wholly herbaceous and thinnish, hoarily and somewhat viscidly villous, or in some specimens only sparsely so; rays many and showy, deep yellow.

Alpine species of the Colorado mountains; type from Union Creek Pass, at 10,000 to 11,000 feet, by John Wolf, 1873.

Here also I refer Hall & Harbour's n. 255, and other specimens by later collectors.

PYRROCOMA HOLOLEUCA. Small plants, 4 or 5 inches high, many-stemmed, all the parts, even to the involucres, more or less whitened with a loose cottony or flocculent indument: basal leaves lanceolate, acuminate, usually incise-serrate, sometimes quite entire: flowering stems many, slender, leafy-bracted, in young plants apt to bear two or more heads, in the more mature always monocephalous: heads low-hemispherical, ½ inch wide exclusive of the many and quite showy though rather narrow rays; bracts of the involucre in 3 series, of herbaceous texture, densely white-lanuginous: achenes silvery-silky, the hairs closely appressed.

Yellowstone National Park, collected under the direction of Dr. E. H. Mearns, 1902; special station not named. The collector's numbers in U. S. Herb. are 3188, 3190, 3191 and 3191[a].

PYRROCOMA AMPLECTENS. Stems 1 or 2 from the root, upright from a slightly decumbent base, a foot high or more, monocephalous; all parts glabrous except the stem near the head of flowers: basal leaves narrow, linear-lanceolate, 5 to 8 inches long, rather obtuse, quite entire; cauline of the same form and large, 2 to 4 inches long, sessile and clasping the stem: head distinctly broad-turbinate, an inch high and more, quite as broad; bracts of the involucre green-herbaceous except at the very base, even of thinnish texture, oblong or oval, obtuse, forming more than two series, but subequal and little imbricated: rays large and showy, almost as in *P. crocea*.

Mogollon Mountains, New Mexico, at 9,000 feet, O. B. Metcalfe, 17 Aug., 1903.

PYRROCOMA DEMISSA. A robust dwarf, the herbage of subcoriaceous texture and glabrous: basal leaves seldom 2 inches long, with very short-petiolar base, the blades oblong-lanceolate, acute, either entire or few-toothed, the teeth subserrate: pedunculiform stems decumbent, leafy-bracted, monocepha-

lous, the heads ¾ inch broad, nearly hemispherical, their bracts in several series and imbricated, spatulate-oblong to oval, pungently acute, green-herbaceous mainly, but with callous whitened and entire margins: rays manifest, deep-yellow: achenes nerveless, glabrous and shining; pappus coarse.

Subalpine on Mt. Stanford, eastern California, C. F. Sonne; the type specimens collected in August, 1888, the plant not otherwise known.

PYRROCOMA MICRODONTA. Stems erect, a foot high, not stout, with smooth whitish and shining bark, toward the summit bearing a rather strict raceme of 5 or 6 heads; basal leaves lanceolate, entire, or the margins of some obscurely denticulate; cauline leaves ovate, lanceolate, sessile by a broad base, their margins rather closely and minutely callous-denticulate or spinulose: involucres between hemispherical and turbinate, ½ inch high and about as broad, much imbricated, the almost corneous bracts with broad subsquarrose green tips, these marginally denticulate, on the back scaberulous: rays not very conspicuous, light-yellow.

Inyo County, California, at Resting Springs Valley, 6 Feb., 1891, Coville and Funston; being n. 269 of the Death Valley collection, as in U. S. Herb.

PYRROCOMA SESSILIFLORA. Stems many, ascending, a foot high or more, with glabrous straw-colored bark, subspicately floriferous from below the middle: basal leaves 3 inches long, linear-lanceolate, very firm, commonly entire, sometimes toothed, always sharply serrulate-scabrous, the flattened and subpetiolar base hispid-ciliate; cauline remote, lance-linear, sessile: involucres turbinate, small, sessile singly in the axils of the leafy bracts; those of the involucre cartilaginous, but with short, broadly triangular abruptly very acute green tips: rays few but large for the heads, light-yellow.

Collected somewhere in southern Nevada, at an altitude of 3,000 feet or more, in 1898, by C. A. Purpus; his n. 6340 as in U. S. Herb. Superficially recalling *P. glomerata* of the far Northwest; in character wholly different.

PYRROCOMA PRIONOPHYLLA. Stems upright, 2 feet high, stout, glabrous, the bark whitish, almost polished, racemose from above the middle: basal leaves a foot long, including the very broad and short scarcely petiolar base, narrowly oblong-lanceolate, less than an inch wide, very coarsely and evenly serrate-toothed, everywhere glabrous except as to the finely scabrous margin; cauline leaves much reduced, sessile, more finely and more saliently serrate: heads small for the plant, forming a short and rather strict raceme; involucres broadly turbinate, much imbricated, the bracts coriaceous, but with green tips which are pungently acute: rays rather small and few, light-yellow.

Eagle Valley, Nevada, C. F. Baker, Aug., 1902, his n. 1450 as in U. S. Herb.

PYRROCOMA SUBCAESIA. Small plants quite like *P. calendulacea* in habit and size, larger ones nearly a foot high and more than monocephalous, the stronger stems corymbosely sustaining 3 large and subequal heads; bark of stems reddened and sparsely villous-tomentose; herbage otherwise altogether of a dull glaucescent green and rather firm; basal leaves elliptic-lanceolate, acute; cauline spatulate-lanceolate to ovate-lanceolate, minutely but strongly reticulate, glabrous except as to the denticulate-scabrous margins: involucre low-hemispherical, large, 1 to 1½ inches wide, bracts spatulate-oblong, mainly herbaceous, very acute, loosely villous-hairy on the back, marginally villous-ciliate; rays 20 or more, clear yellow, showy; achenes closely low-ribbed and loosely pilose; pappus scanty, coarse.

Panguitch Lake, Utah, at 8,400 feet, M. E. Jones, 7 Sept., 1894.

PYRROCOMA CREPIDINEA. Many-stemmed and low, 3 or 4 inches high, whitened with a kind of soft silky wooliness: basal leaves lanceolate or elliptic, short-petioled, 1½ to 2 inches long, somewhat dentate; cauline leaves ovate-lanceolate, with broad subcordate-clasping base; the decumbent stems bearing usually three slender-peduncled small heads; involucres rather full-hemispherical, their small bracts in two

or three series and lanuginous: rays many, rather short; achenes hirtellous.

Near Alkali Spring, Buffalo River, central Wyoming, 5 Aug., 1901, Merrill and Wilcox, their n. 1137 as in U. S. Herb.

PYRROCOMA PLANTAGINEA. Smallish plant, inhabiting low subsaline soils; the basal leaves entire, broadly or narrowly lanceolate, apparently somewhat fleshy, glabrous, their petioles short and, like the stems, dark-reddish or purplish; flowering stems 2 or 3 to 5 or 6 inches high, commonly monocephalous, not rarely with 2 or 3 low-hemispherical heads; bracts of involucre rather herbaceous, in hardly more than two series but unequal, puberulent and often more or less lanuginous with loose deciduous wool which also often colors the younger parts of the stem: rays many, deep-yellow and showy: achenes silky and pappus quite fine and soft.

Apparently abundant in certain parts of the Yellowstone Park, and southward in western Wyoming. Rydberg and Bessey's n. 5051 as in U. S. Herb. represents a common monocephalous form of it; but it varies greatly.

PYRROCOMA LAPATHIFOLIA. Robust, upright, the several stems 2 feet high, loosely racemose above the middle: basal leaves 6 to 8 inches long including the very stout and rather short petioles, apparently of subsucculent texture when fresh, the blades oblong-lanceolate, or some with subcordate base, entire, light-green, glabrous; cauline few, short, sessile and half clasping, lanceolate, acuminate, spinulose-serrate: heads long-peduncled, the peduncles reddened, somewhat flocculent, quite woolly at summit just under the nevertheless glabrous bracts of the involucre; these very many and narrow-linear, yet little imbricated, encompassing low-hemispherical heads ¾ inch wide.

Remarkable species, with basal leaves not unlike those of *Rumex salicifolius* in size, form and texture; the cauline as different in form as can well be imagined. The specimen in U. S. Herb. purports to have come from somewhere in Utah, in 1875, by the hands of L. F. Ward.

New Composites from Oregon, Washington and Idaho.

Senecio Chapacensis. Perennial, the tufted leaves and low stems from the stout branches of a hard caudex, the whole plant 5–7 inches high, glabrous: basal leaves many, rather fleshy, short-petioled, obovate and oval, cuneate and entire at base, the obtuse or subtruncate apex coarsely crenate, some also laterally crenate: the stout pedunculiform stems with two or three sessile pinnatifid small bracts: heads of less than middle size, 6–18 in a mostly, simple fastigiate corymb; bracts of involucre 12–15, narrow-lanceolate: rays deep-yellow, oblong, somewhat narrowed, and sharply 3-toothed at apex.

Mount Chapaca, in Okanogan Co., Washington, at 4,000 ft., collected by A. D. E. Elmer, Aug., 1897. Collector's n. 592, as on sheet 352360 U. S. Herb. In Mr. Piper's Flora of Washington this is called *S. cymbalarioides*, though there is not one essential point at which it agrees with Nuttall's character of that species.

Senecio ligulifolius. Stems one or several, subligneous at base and decumbent around the crown of a taproot, 7–12 inches high, the whole plant canescently tomentulose, the wool apt to be more or less deciduous from the upper face of foliage in age: basal leaves mostly tufted on sterile shoots, the narrowly oblong obtuse blades not equalling the rather wide petioles, their margins entire, short-revolute, the whole 2–4 inches long, the tuft upright; cauline leaves reduced, few, sessile, entire or toothed, no revolute: heads middle-sized, not very numerous, in a fastigiate corymb; involucres narrowly subcampanulate, loosely tomentulose at base only: rays rather short, oblong, obtuse, the teeth very short and obscure: pappus fragile and deciduous; achenes glabrous.

Near Waldo, Oregon, 14 June, 1904, C. V. Piper. Sheet 527705, U. S. Herb.

Senecio leucocrinus. *S. fastigiatus*, Nutt. (1841), not of Schweinitz (1824). Since this fine species is in need of a name I give it one that is suggested by its beautiful soft pap-

pus, which is also usually wavy below the summit, and which also is not deciduous from the mature achene, as it is in *S. ligulifolius*.

Senecio auleticus. Low tufted perennial with nearly naked and mostly monocephalous stems 3–9 inches high, the stems and their bracts, as also the involucres floccose-tomentulose, the foliage hardly so: blades of basal leaves suborbicular to obovate, from less than ½ to 1 inch long, lightly and often obscurely crenate or dentate, slightly succulent, on petioles of twice or thrice their length; cauline leaves mere sessile flocculent bracts: involucre campanulate, nearly ½ inch high and as broad; rays deep golden yellow, elongated-oval, at least 5-nerved, at apex very obtuse and with three short and obscure teeth.

The type specimens of this very good new *Senecio* are from "eight miles south of Waldo," Oregon, by C. V. Piper, 14 June, 1904. They are in U. S. Herb., under the collector's n. 5079. His numbers 6254 and 6145 appear to be specifically the same, and are from the same general region.

Pyrrocoma Balsamitae. Stems few, stout, 1 to 2 feet high, spicate above the middle with few and rather remote middle-sized heads, the whole plant to the naked eye glabrous, of a light-green inclining to yellowish: leaves subcoriaceous, the basal 2 to 4 inches long, the oblong-elliptic blade little surpassing the narrow petiole, evenly crenulate or subserrate-crenulate, the lower cauline spatulate-lanceolate, the upper oblong, all the cauline sessile: heads broadly turbinate, ½ inch high, nearly or quite sessile, elegantly imbricated bracts of involucre with linear base and rhomboid green tips, their whole margin very definitely villous-ciliate: rays not numerous, light-yellow.

Wet meadows, summit of Cascade Mountains, Oregon, 12 Aug., 1902, W. C. Cusick; his n. 2947 as in U. S. Herb. Foliage remarkably simulating that of the old-fashioned fragrant garden herb Balsamita.

PYRROCOMA HALOPHILA. Stems several, seldom 6 inches high, rather rigid, ascending, racemose above the middle; herbage pale and glaucescent, with or without traces of woolliness: basal leaves lanceolate, entire or evenly serrate; cauline reduced, entire, very lanuginous at the sessile base only: heads on slender pedicels, the involucres turbinate, less than ½ inch high, bracts oblong-linear, the outer obtuse, the inner acute, all more or less lanuginous and most so marginally: rays few, short.

In an alkaline meadow, Goose Lake Valley, Oregon, 19 Aug., 1901, W. C. Cusick; his n. 2769 as in U. S. Herb.

PYRROCOMA DURIUSCULA. Stems, few, erect, very hard, rigid, glabrous, 2 feet high, simple and loosely spicate at summit, sometimes with one or more spicate branches: basal leaves narrow-lanceolate, pungently acute, perfectly entire, but margins scabrous; lower cauline lanceolate, sessile, sharply serrate: involucres turbinate, more than ½ inch high, their bracts much imbricated, of hard texture, with pungently acute green tips and scabrous margins: rays few, short, deep-yellow: pappus not very coarse.

Stony ground somewhere in eastern Oregon at 3,500 feet altitude, W. C. Cusick, Aug., 1897; n. 1755 as in U. S. Herb. Also the same under number 530, collected in 1882.

PYRROCOMA LANULOSA. Of low growth, with copious basal leaves and decumbent stems of *P. hirta*, the foliage similarly incise-serrate, but pubescence of the whole plant widely different, in no degree viscid or glandular, but dense, white, softly villous, giving the appearance of white-woolliness: heads subracemose, 3 to 7, short-pedicelled; involucres subturbinate or broader, their bracts not many, subequal, lance-linear, pungently acute, whitish-pubescent on the back: rays few, short, inconspicuous.

This does not appear to have been collected elsewhere than in Lake County in southern Oregon; the collectors being Mr. Leiberg (1894) and Coville and Leiberg (1896). There are three sheets of it in U. S. Herb., that of Leiberg's n. 748 being regarded as the type.

PYRROCOMA TURBINELLA. Stems several, slender, ascending, 7 to 9 inches high, scarcely leafy, loosely corymbose panicled above: basal leaves 3 or 4 inches long, lanceolate, acute, remotely and rather coarsely incise-serrate, the short petioles, the basal part of stems very softly silky-lanuginous and quite retrorsely so; cauline leaves small, oblong, very acute: heads ½ inch high, with involucres exactly turbinate; bracts imbricated but not very numerous, linear, very acute, erect, cinereously pubescent with a short, stiff viscidulous indument: rays few, not showy, light yellow: pappus not copious, rather delicate.

In dry ground, Cycan Valley, eastern Oregon, W. C. Cusick, 1901; his n. 2744 as in U. S. Herb.

PYRROCOMA CUSPIDATA. Stems slender, arcuately ascending, 7 to 9 inches high, more corymbose at summit, the heads about 3 only: basal leaves lanceolate, depressed, glabrous, finely and evenly serrulate or else quite entire; cauline reduced, entire, acute: heads ½ inch high, broadly turbinate, the bracts strongly imbricated and numerous, linear-oblong, cuspidately acute, glabrous except as to the lower, these not pubescent but only ciliate: rays short, but rather many, golden-yellow: pappus firm.

Margin of Cycan Marsh, eastern Oregon, W. C. Cusick, 10 Aug., 1901; part of his n. 2741 as in U. S. Herb.

PYRROCOMA LIATRIFORMIS. Stoutish, rigid, two feet high, loosely racemose from above the middle: foliage firm, rather deep-green underneath a sparse but definite grayish pubescence: lowest leaves 6 or 8 inches long, petiole and blade subequal, the latter lanceolate, entire; those of the raceme reduced to sessile lanceolate bracts: heads turbinate, ¾ inch high, at summit quite as wide exclusive of the few rays; bracts of the involucre very many, strongly imbricated, linear and coriaceous below the lanceolate and greenish but whitish-villous tips, these apt to be a little squarrose.

Known to me only as collected at Pullman, Washington,

Aug., 1903, by Mr. C. V. Piper. The plant strikingly simulates in its whole aspect *Liatris scariosa*.

PYRROCOMA SONCHIFOLIA. Stem upright, less than a foot high, leafy to the summit and monocephalous: basal leaves 3 to 5 inches long, short-petioled, the blade broadly obovate-lanceolate, acute, irregularly and divaricately or even here and there retrorsely dentate, the cauline oblong-lanceolate, acute, sessile by a broad base, subentire, all the foliage thin, and, with the stem, more or less whitened with a villous-arachnoid indument: involucre ¾ inch high and as broad, hemispherical inclining to broad-turbinate; bracts in 2 series and subequal, narrow, very acute, viscidly villous; rays rather few and short.

Said to have been derived from the Yakima region, State of Washington; collected on Canby's expedition in 1882 by T. S. Brandegee. Foliage thin, curiously simulating that of some cichoriaceous plants.

PYRROCOMA SUKSDORFII. A foot high or more; stems rigid, upright above a slightly decumbent base, subspicate, rarely subracemose, above the middle; lowest leaves lanceolate, cauline spatulate-lanceolate below the inflorescence, the remainder lanceolate, sessile, all hard of texture, entire, almost pungently acute, pale-green, under a lens very conspicuously reticulate and somewhat scaberulous, the stems with scattered villous pubescence: involucres broadly turbinate, ½ inch high and as broad; bracts much imbricated, with white-villous tips: rays somewhat numerous but small.

Prairies of Spokane County, Washington, W. N. Suksdorf, 18 July, 1889, as in U. S. Herb.

PYRROCOMA FOLIOSA. Stems several, erect, a foot high or more, notably leafy up to the heads with large sessile foliage mostly sharply serrate; basal leaves large, strongly petiolate, ascending, lanceolate, acute, strongly and sometimes incisely serrate, the whole of a light almost yellowish green, and, with the stem, more or less softly and viscidly villous, the texture thinnish rather than very firm: heads solitary or several, hemispherical, from less to more than an inch in diameter

without the rays; outer bracts of involucre foliaceous, exceeding the rays, inner successively smaller, all linear-lanceolate, acute, entire, ciliate with soft viscid hairs.

Collected somewhere in the Territory of Washington, by G. R. Vasey, in 1889; sheets 296812 and 296811 of U. S. Herb., the former, monocephalous, the latter with 3 or 4 heads and these smaller.

PYRROCOMA PRATENSIS. Stems clustered, erect, more than a foot high, notably leafy to the summit; basal leaves on firm petioles that are upright and longer than the lanceolate acuminate blades; cauline spatulate-lanceolate, sessile, all of a light-green but not yellowish hue, all saliently and pungently serrate-toothed, the pubescence scanty and villous without viscosity, the herb appearing glabrous to the unaided eye: heads 1 to 3 and subsessile, low-hemispherical, an inch broad without the rays; bracts in few series and little imbricated, the outer foliaceous, almost linear, very acute, far surpassing the inner, all whitish-hairy at base.

Dry field, in southwest corner of Camass Prairie, Idaho, 14 July, 1895, L. F. Henderson, his n. 3113 as in U. S. Herb.

PYRROCOMA SCABERULA. Stems several, upright, rather slender, 2 feet high, monocephalous, stiffly or almost hispidly short-hirsute: basal leaves 5 to 7 inches long, the blades exactly lanceolate, entire, scabro-hirtellous on both faces and much reticulate, of firm texture yet thinnish, the petioles narrow, not elongated; cauline few, lance-linear, sessile: involcres an inch broad, ¾ inch high, their bracts large, moderately imbricated, not numerous, spatulate-lanceolate, acute, scabrous-ciliolate: rays not very conspicuous.

Nez Perces Co., Idaho, 1896, A. A. Heller, his n. 3469, sent out for *P. integrifolia*, but most unlike that every way.

PYRROCOMA SERICEA. Stems few, firm but not stout, ascending, 3 to 5 inches, loosely white-woolly as also the small sessile cauline leaves; basal leaves lanceolate, very acute, entire or with few and remote very salient teeth, white on both faces with a long soft and almost silky wool: heads mostly solitary

and manifestly pedunculate; involucre low-hemispherical, more than ½ inch broad, not as high; bracts subequal in 2 series, thin, narrow, lanuginous: rays many, rather conspicuous, orange.

Beautiful little plant, and of a marked specific type, collected somewhere in Idaho, by Edw. Palmer, in 1893.

New Plants from Arizona.

SENECIO QUERCETORUM. A stout hollow-stemmed sparingly leafy perennial a yard high, glabrous throughout, the angular stem notably glaucescent: basal leaves 8–10 inches long, lyrate, the terminal segment ovate, 3 inches long, the laterals small and variable, alternately larger and smaller, all closely and sharply dentate, but with deep and obtuse sinuses between the teeth; cauline leaves lyrate-pinnatifid, sessile by broad and clasping stipuliform bases: inflorescence an ample broad and much flattened compound cymose corymb of smallish heads: involucres subcampanulate, of 12–15 narrowly lanceolate acuminate glabrous bracts, with narrow scarious margins: rays about as many, narrow, elongated: pappus fragile.

Species known only as collected on "Oak Creek" in Arizona as long ago as 1883, by H. H. Rusby, distributed by him under n. 672, and with the name *S. Neo-Mexicanus*, to which the plant bears no manner of resemblance. As to size and general aspect of stem and foliage it recalls no other Senecio except *S. Breweri*, which is of the far distant middle Californian seaboard; and even between these two the differences are marked enough.

SENECIO BLUMERI. Many stems and tuft of basal leaves crowning an ascending tap root, the whole plant 10 inches high: leaves 1½–3 inches long, of firm almost subcoriaceous texture; blades obovoid, very obtuse, lightly and coarsely crenate, tapering to a petiole of their own length, glabrate and pallid above, beneath white-tomentose: stems nearly naked,

mostly with about 3 large heads; involucres ½ inch high and much broader, floccose-tomentulose like the pedicels and stems; rays broad and short, deep yellow, conspicuously toothed at apex.

Stony knolls at 8,000 feet in the Chiricahui Mountains, Arizona, 1907, J. C. Blumer. Species of the group to which *S. Greenei* and *S. ionophyllus* of California belong, as well as *S. Franciscanus* of northern Arizona.

SENECIO STYGIUS. Tall plant, glabrous and leafy like the last, only in every way less robust, the root only annual or biennial: lowest leaves not seen, but cauline lyrate-pinnate, embracing the stem by an ample and lacerate stipuliform base: heads quite small, very numerous, slenderly pedicellate, forming a large loose subpaniculate corymb 6 or 7 inches across: bracts of the short subcampanulate involucre 12–15, oblong-lanceolate, acuminate: rays yellow, as long as the involucre, not broad at apex and distinctly 3-toothed: pappus delicate and fragile.

Grand Cañon of the Colorado, J. G. Lemmon, May, 1884. In U. S. Herb., the sheet not numbered.

SENECIO LATHYROIDES. Tufted perennial, with rigid ascending leafy stems 2 feet high, with a loose cymose panicle at summit: herbage wholly glabrous, the slightly tortuous stems striate and angled, very light-green: leaves all somewhat pectinate-pinnate, of 6 or 8 lateral lobes and a terminal, all very narrowly linear, the rachis itself of the same character, even the most reduced and diminutive floral bracts, in the same way pectinate-pinnate, none simple: branches of the cymose panicle naked, tortuous, each ending in about 3 broadly cylindric heads ½ inch high: calyculate bractlets at base of involucre stiffly somewhat ciliolate; bracts of involucre 20 or more, linear-acuminate, glabrous: rays long and showy, about 8-nerved, very obtuse at apex, the teeth obsolete.

At Pierce's Spring, Arizona, 18 April, 1894, M. E. Jones; his n. 5077 as in U. S. Herb. A plant of the same alliance as *S. spartioides* of Colorado, but with foliage recalling that of wild peas or vetches; the stem itself, and more so the

branches of the lax inflorescence, so tortuous as to suggest almost a reclining if not half-prehensile mode of growth.

SENECIO ENCELIA. Perennial, a foot high; leaves many, in a basal tuft and short-petioled; almost all parts of the plant white with a dense pannose tomentum, or this somewhat flocculent on the stem: lowest leaves suborbicular to oval and small ½–¾ inch long, toothed across the obtuse summit, the others ovate and lance-ovate, entire, acutish, 1½–3 inches long including the short petiole, all of rather firm texture, only the lowest and oldest glabrate above, cauline reduced to few lanceolate sessile bracts: heads of middle size, in a compact and compound fastigiate corymb; bracts of involucre lance-linear, glabrous except at base: rays oblong, acutely 3-toothed: pappus fragile; achenes glabrous.

Pinal Mountains, southern Arizona, 26 May, 1890, Marcus E. Jones. Specimen on sheet 220118, U. S. Herb. The foliage, in form as well as indument, recalls the most woolly species of *Encelia*.

GUTIERREZIA LINOIDES. Suffrutescent, very slender, 2 feet high; stems loosely leafy below, very loosely corymbose at summit; the very lowest leaves narrowly oblanceolate, the others linear, mostly 1½ inches long, rather sparsely scabrous-serrulate, the upper face also more or less scaberulous as well as resinous-punctate, all the foliage of the main stems deflexed, that of the sterile twigs reduced in size and widely spreading when not deflexed: involucres shortly subcylindric, about 5-flowered, the rays 2 or 3 and rather conspicuous, those of the disk about 2.

Limestone slopes of the Chiricahui Mountains, J. C. Blumer, 1907.

PYRROCOMA ADSURGENS. Stout, low, the several flowering stems less than a foot high, assurgent from a strongly decumbent base, very sparingly villous-hirsute, the hairs deflexed: basal leaves lance-oblong, 2 to 5 inches long, tapering to short winged petioles, crisped along the edges, a very narrow margin callous-whitened and scabrous-serrulate; cauline leaves copious, sessile, ascending, all the foliage glabrous: head soli-

tary, short-peduncled, turbinate, an inch high, more than an inch broad, the bracts many, strongly imbricated, coriaceous but with hard and cuspidate green tips, the outer somewhat spatulate-oblong, the inner broadly linear, all acute and rigid: rays rather many, not showy.

Mountains of northern Arizona, especially those near Flagstaff, where it has been collected by Rusby (1883), Lemmon (1886), M. E. Jones (1884), and MacDougal (1891).

SARACHA SESSILIS. Annual, 2 feet high, with several widely spreading angular branches from near the base; herbage wholly glabrous; leaves very thin and ample, the larger 5 and 6 inches long exclusive of the slender petiole, 3 and 3½ in width near the middle, broady ovate, very acute at both ends, perfectly entire; umbels 3-flowered, sessile, or very nearly so in the axils of the leaves: corollas very small and white, fruiting calyx 5-lobed, apparently rotate, nearly 1 inch wide, imperfectly or not at all enfolding the rather small berry.

Shady nooks of the Chiricahui Mountains at about 6,000 feet, J. C. Blumer, 1907.

LUPINUS BLUMERI. Perennial, the ascending stems slender and dry, not succulent, a foot high or more, loosely leafy, sparsely pilose: leaves rather large for the plant; leaflets about 8, very unequal, the longest 2 inches, the shortest little more than 1 inch, narrowly oblanceolate, abruptly acute, glabrous above, beneath sparsely appressed-hairy, the margins beset with unequal pilose hairs: racemes few-flowered and short, nearly sessile, too few-flowered to appear definitely verticillate: corollas large, more than ½ inch long; banner at first pale violet with orange center, this orange changing to very dark purple; wings about as large as the banner, violet; keel uncommonly broad and short, not equalling the wings, shortly somewhat woolly-ciliolate from below the middle to the apex: pod not known.

Chiricahui Mountains, at about 8,000 feet, J. C. Blumer, June, 1908. Said to be a handsome and showy plant, early flowering.

CICUTA GRANDIFOLIA. Rootstock an inch thick when dry, short-jointed, horizontal, producing from beneath many and closely approximate thick fleshy roots, these terete, straight, several inches long: basal leaves a yard long or more, bright green, glabrous; leaflets oblong-lanceolate, acute, subsessile, very closely evenly and deeply serrate, 3–4 inches long: fruit large, round-ovate; ribs not greatly exceeding the intervals in breadth.

Margin of a stream at western shore of Mormon Lake, northern Arizona, 1908, collected by G. A. Pearson. Plant related to *C. occidentalis* of Colorado and Wyoming, but with much ampler foliage very remarkably incise-serrate; the rootstock and roots very characteristic.

PERSICARIA GRANULATA. Branched at the base, the branches ascending, a foot long, very slender, the internodes elongated and foliage sparse; leaves narrowly lanceolate, 1½–2½ inches long, entire, punctate, glabrous, the midvein beneath and the margins roughish with a few hair-points: ocreae thin and hyaline, naked at the orifice, the uppermost short and open: spikes few, oblong, ¾–1½ inches long, on slender peduncles: ocreolae ovate, entire, glabrous except for a granular-scaberulous indument which is equally obvious upon the whole exterior of the perianth: achenes small, polished, the style cleft nearly to the base and the recurved branches inclined to be persistent.

Collected on the Rio Verde in Arizona, in 1867, by Dr. Smart; type in U. S. Herb., the sheet not numbered.

New Californian Asteraceæ.

Corethrogyne floccosa. Evidently large and bushy, perhaps shrubby at base; stem, branches and leaves silvery-hoary with a light floccose tomentum: cauline and rameal leaves oblong, obtuse, sessile by a cordate-clasping base, entire below the middle, above it sharply cut into close spreading serrate teeth: heads many, scattered singly at the ends of filiform twigs, the whole forming a large loose corymbose panicle, the pedunculiform twigs not floccose but green and rough with short gland-tipped hairs: involucres turbinate, less than ½ inch high, their well imbricated bracts glandular-scabrous and viscid, their tips subsquarrose: rays deep-purple; achenes silky, crowned with dark red-brown pappus.

Collected at Elwood, near Santa Barbara, Sept. 1908, by Miss Eastwood.

Corethrogyne scabra. Suffrutescent, with rigid upright stems 2 feet high or more, leafy up to the not very ample virgate panicle: herbage wholly devoid of wool or hoariness, except as to basal part of stem when young, all parts in maturity dull dark green and very scabrous: leaves oblong-lanceolate, 1–1½ inches long, sessile, acute, sharply and evenly serrate above the middle: branches of panicle widely spreading, mostly monocephalous: involucres almost campanulate, less than ½ inch high, their many imbricated and squarrose bracts viscid-scaberulous: rays short, red-purple: achenes cuneate-linear, silky; pappus fuscous.

Los Angeles Co., collected by H. E. Hasse in 1890; again at Griffith Park, and on Cahuenga Hills, in 1902, by Ernest Braunton; though specimens from Cahuenga Hills do not agree as to inflorescence, and may, perhaps, represent a second species marked by this lack of woolliness.

Corethrogyne sessilis. Branches, tall, erect, simple, leafy to the summit, the whole plant even to the involucres white with a thin tomentum: leaves thin, oblong-oval, sessile by a broad cordate-clasping base, 1½ inches long or more,

subentire, or with few serrate teeth at summit: involucres large, campanulate, mostly subsessile singly in the axils of the leaves which much exceed them, a few pedunculate ones at summit of stem or branch: bracts of involucres much imbricated, but almost concealed by the woolly investure.

San Bernardino Mountains, S. B. Parish, 23 Oct. 1891.

CORETHROGYNE BREVICULA. Low, much branched from a ligneous basal part, the branches 5 to 8 inches high, widely corymbose-panicled from about the middle; branches and leaves with a thin but close and permanent tomentum: leaves small, oblanceolate, obtuse, entire: branches of panicle and bracts thereof rough and also viscid with many short-stipitate glands: involucres broadly turbinate, less than ½ inch high, their much imbricated bracts with acute spreading tips viscid-glandular and recurved, also marginally beset with short-stipitate glands: achenes oblong-linear, thinly soft-silky; pappus rather copious, reddish.

Mountains of San Diego Co., Oct. 1899, C. R. Orcutt. A plant from the same general region, collected by E. A. Mearns, in August, 1894, is provisionally referred here, is as small, less shrubby, and with different involucres, though with the same pubescence.

CORETHROGYNE RACEMOSA. Evidently half-shrubby, the straight ascending branches uncommonly stout, densely and permanently white-tomentose, all subracemose from below the middle: leaves small for the plant, white-woolly on both faces, entire: heads mostly solitary and short-peduncled in the leaf-axils; peduncles and turbinate involucres roughly viscid-glandular: purple rays unusually large and showy; achenes rather loosely silky; pappus fuscous.

Mountains of San Diego Co., C. R. Orcutt, 1889. Specimens in U. S. Herb. on same sheet with those typical of *C. brevicula*, but species most distinct in habit, pubescence and inflorescence.

CORETHROGYNE FLAGELLARIS. Basal parts unknown; branches of a foot long perhaps reclining, at least very slen-

der, leafy and flagelliform, not numerous, each ending in a large campanulate head, both leaves and branches very white with a more or less persistent wool, this extending to the lower half of the involucre, but there ending abruptly; leaves of branches oblanceolate to oblong, mucronate-acute, entire: head ¾ inch high, 1¼ inches wide including the rather large rays: upper bracts of involucre green and very glandular, only the lower woolly: bristly tufts of style-tips conspicuous.

Along the seaboard at Redondo, Los Angeles Co., 25 May, 1902, Ernest Braunton. A new member of that coastal group of species which is vernal in its flowering. All other species here described are autumnal—even late-autumnal.

CORETHROGYNE LAVANDULACEA. Tall, rigid, perhaps suffrutescent; fastigiate branches rigidly ascending, hoarily pannose-tomentose, as are also the entire oblanceolate or oblong small cauline leaves; basal leaves not known: heads few, of middle size, corymbose at ends of branches: involucres broadly turbinate, nearly ½ inch high, the very many straight linear bracts closely imbricated, pungently acute, minutely and viscidly glandular-scaberulous but not tomentose: rays broad, short, of a rich lavender-purple: achenes nearly linear, lightly silky-villous, crowned with the usual brownish pappus.

Santa Catalina Island, California, Mrs. Trask, Sept. 1898. Plant said to be common in one particular part of the island on dry slopes.

LESSINGIA BAKERI. Upright and rather strict, 1 foot high or more, with few rigid short subcorymbose branches above the middle: herbage in no part very woolly: cauline leaves ovate, cuspidate-acute, sessile, those of the branches smaller, not crowded or imbricated: heads subturbinate, ½ inch high or less, some sessile in the axils, more of them corymbose in those at the ends of the branches; bracts of involucre arachnoid-pubescent, not really woolly: corollas light rose color.

Grassy slopes near Searsville, San Mateo Co., C. F. Baker, Oct. 1902; mistaken by myself, but hastily and without comparing, for my *L. hololeuca*, which does not belong to this division of the genus.

LESSINGIA MICRADENIA. Slender, 2 feet high or less, rather diffusely corymbose-paniculate from below the middle: lowest leaves oblanceolate, petiolate, serrate-toothed, upper and rameal oblong and oval, sessile, entire, both faces of all floccose-tomentose; slender pedunculiform monocephalous branchlets with many minute erect bracts, these and the involucres densely stipitate-glandular: heads small and few-flowered; bracts rather few and not strongly imbricated, their tips not very acute and none squarrose: corollas purple.

Mt. Tamalpais, and elsewhere among hills of Marin Co.; type in my herbarium, heretofore mistaken for *L. ramulosa*.

LESSINGIA BICOLOR. Branched loosely from the base, the branches few, rather slender, purplish, minutely puberulent and stipitate-glandular: basal leaves oblong-lanceolate, acute; cauline oblong-ovate, acute, sessile and cordate-clasping, all white-tomentose above, green and scaberulous beneath, the margins beset with a few stipitate-glands: heads few and broad, each at the end of a slender branchlet, campanulate, the inner bracts purple, the outer green, some tomentose, all more or less glandular: corollas small, deep-purple.

Santa Rosa, Sonoma Co., 18 Aug. 1902, A. A. Heller; distributed under the name *L. ramulosa*, but in truth a very different plant of quite remarkable characters.

LESSINGIA MENDOCINA. More than a foot high, simple up the middle, there parted into several long slender widely spreading branches bearing many wiry but almost filiform flowering twigs, these copiously bracteate below, floriferous only at or very near their ends: basal leaves unknown; cauline ovate-lanceolate, acute, spreading, floccose-woolly on both faces: involucres small, turbinate, many-bracted and closely imbricated, the bracts tomentulose below, the erect purple tips bearing each a conspicuous but small gland at the very summit: corollas small, deep-purple: pappus of rather firm bristles about equalling the silky achene.

Near Mendocino, Mendocino Co., Aug. 1898, H. E. Brown; in U. S. Herb. under collector's number 940.

LESSINGIA IMBRICATA. Stout, rigid, simple, or with a few rigid virgate branches, 6–10 in. high, soft-woolly; basal leaves lanceolate, petiolate; cauline short, ovate, acute, sessile and cordate-clasping, erect, those of the upper part of stem and of the branches crowded and imbricate: heads sessile in the axils of the upper leaves, and glomerate at summits of stems, nearly cylindric, more than ½ in. high, their bracts arachnoid-woolly: flowers not numerous, rose-purple, fading pinkish.

Foothills west of Los Gatos, A. A. Heller, 12 Sept. 1904; the specimens distributed for *L. hololeuca*, from which this plant differs widely by its virgate inflorescence, and long narrow heads.

LESSINGIA ARACHNOIDEA. Very tall, simple to above the middle, thence loosely cymose-panicled and rather few-flowered; stem and branches glabrous, glandless; cauline leaves villous-flocculent on both faces, the reduced rameal ones glabrous beneath: heads much above middle size, obovate and many-flowered; bracts of involucre numerous, evenly and closely imbricated, pungently acute at tip, the margins densely arachnoid-woolly: corollas purple: pappus very short, amounting to little more than a setose crown at summit of achene.

Beautiful and most distinct species, known only as collected in the vicinity of Crystal Springs, San Mateo Co., by C. F. Baker in 1902.

LESSINGIA SUBSPICATA. Some two feet high or more, with many virgate ascending branches from below the middle, the slender ultimate branchlets alone floriferous above the middle, and spicately, with also several heads sessile and glomerate at the end of the twig: only rameal leaves known, these ovate-oblong, acute, entire, glabrous and punctate beneath, white-woolly above, the margins with few and small stalked glands; bracts of flowering twigs small and erect, the uppermost with a head in the axil of each: involucres small, cylindric, 3–5-flowered; bracts many, erect, acutish, villous-flocculent: achenes linear, villous; pappus setose, rather short.

At Buffalo Ranch, which must be among the western foot-hills of the Sierra Nevada in middle California, collected only by John B. Leiberg, 28 Sept. 1900. Plant with spicate heads, yet very distinct from the altogether white-woolly *L. virgata*, which plant is spicate everywhere, and without those filiform ultimate twigs which alone are floriferous in the present species.

LESSINGIA GLOMERATA. Plants 6 to 15 inches high, simple at first, but parted much below the middle into several fastigiately ascending very leafy branches, these again parting into closely bracted branchlets bearing heads only at summit and glomerately: basal and lower cauline leaves oblanceolate, petiolate, all the upper broad, short, sessile, bract-like but numerous, all, like the stem itself, white on both faces with a floccose woolliness: heads small, subturbinate, or between that and obovate, 5 to 10-flowered; bracts of involucre glandular-pulverulent, purple at the not very acute and slightly spreading tips: pappus not copious, a trifle longer than the oblong-linear silky achene.

Plains and hills of Butte Co., collected by C. C. Parry, probably near Chico, 1882; then by Mrs. Austin, near Colby, Sept. 1896.

LESSINGIA CYMULOSA. Upright, 2 feet high, not stout, parted below the middle into ascending branches, these subdivided to form an ample cymose panicle, the ultimate twigs distinctly cymulose, with 1 to 3 heads at the end of each: cauline leaves oblanceolate, thinnish for the genus, distinctly and permanently flocculent on both faces as is also the stem itself; bracts of the slender twigs short, pungently acute, only very sparsely woolly beneath, and there resinous-dotted: involucres very small, turbinate, about 5-flowered, their bracts oblong-linear, acute, glandular-scaberulous at the deep-purple tip: pappus of the slender achenes coalescing at base to form about 5 short paleae ending in the usual unequal bristles.

Specimens, all in U. S. Herb. from near Chowchilla P. O., Mariposa Co., 10 Oct. 1895, by Lester F. Ward. A large species, copiously floriferous with small heads subcymosely

clustered at the ends of numerous widely divergent branches, the involucres narrow, of comparatively few and strongly imbricated bracts.

LESSINGIA FASTIGIATA. Plants upright, slender, less than a foot high, simple up to the middle, there parted fastigiately into 3 to 5 suberect branches, these again simple to near the summit, there dividing abruptly into pedunculiform floriferous branchlets, with heads of flowers mostly glomerate at their ends: leaves of stem and branches oblanceolate to oblong-lanceolate, pungently acute, more or less serrate, white-flocculent on both faces: involucres narrow and few-flowered, subcylindric but with bracts rather numerous and well imbricated, even subsquarrose as to tips, without pubescence, but more or less glandular: corollas purple: pappus more or less paleaceous by basal coalescence of the bristles into 5 sets.

Type specimens of this excellent species are in my herbarium from foothills of the Sierra near Chico, by Mrs. R. M. Austin, 1896. Quite the same, but much too green, is material from North Fork of Feather River, by J. B. Leiberg, in July, 1900. H. P. Chandler's 1503 from Klamath River, in Humboldt Co., is with less confidence referred here.

LESSINGIA PALEACEA. About 2 feet high, slenderly and loosely paniculate from below the middle; glabrous and glandless as to stem and numerous branches and branchlets; leaves oblong, acute, few-toothed or entire, white-flocculent on both faces, those of the many filiform branchlets reduced to minute ovate more or less spreading bracts: involucres solitary at the ends of the many filiform branchlets, subturbinate, of numerous very unequal and much imbricated bracts, these obtusish, villous-tomentose except at the tips: flowers few in the head, purple: achenes crowned by about 5 subulate-aristiform long paleae instead of bristles.

Middle Fork of Cottonwood Creek, Fresno Co., 16 Sept. 1895, collected by L. F. Ward; distributed by C. L. Pollard; type in my own herbarium.

LESSINGIA TOMENTOSA. Stoutish, low, very diffuse, the spread of the short branches 4 to 10 inches, each of the very numerous branches ending in a large campanulate head: basal foliage not known; leaves of stem and branches rather crowded, small, oval or oblong, entire, sessile, white-tomentose on both faces: involucre low, much imbricated, its bracts linear-cuneiform, colorless below the short acute recurved green tip: rays yellow: pappus fuscous.

Southwestern part of the Colorado Desert, California, C. R. Orcutt, 21 Oct. 1889. A plant with habit and aspect all its own; singularly stout and depressed for a *Lessingia;* its heads very numerous and large, as well as quite solitary each at the end of its own branchlet.

Some Western Caulescent Violets.

VIOLA DREPANOPHORA. Allied to *V. adunca* but slender and delicate though upright, about 3 to 5 inches high, seemingly glabrous, but under a lens minutely though sparsely puberulent, the almost filiform petioles and peduncles retrorsely so and almost hispidulous: blades of the leaves cordate-oval, obtuse, lightly crenate, ½ to 1¼ inches long, the petioles twice as long: peduncles far surpassing the leaves, bibracteolate slightly above the middle: sepals subulate-linear, very acute, small, glabrous: corolla deep violet-blue as to the limb of the petals, the greatly elongated stout, falcately upturned spur lavender-purple.

Wallowa National Forest, Oregon, J. T. Jardine, 1909. A most noteworthy and very beautiful new violet, apparently acaulescent, though certainly of the *V. adunca* alliance; the stout but sharply and falcately hooked spur as long as the limb of the petal, and very prominent.

VIOLA VERBASCULA. Caulescent, but leafy stems short, greatly surpassed by the long-petioled basal leaves; the whole 4 to 6 inches high, the tender and delicate herbage glabrous in every part; earliest leaves broadly cordate, ½ to ¾ inch

long, the later oval-lanceolate, 2 inches long, subtruncate at base, all obtuse; slender peduncles bearing the flowers almost beyond the long-petioled leaves, bibracteolate not far below the flowers, the bractlets subulate-filiform, not opposite: sepals narrowly linear-lanceolate but obtuse; corolla purple, about ¾ inch long including the long horizontal subcylindric obtuse spur.

Hangman Creek, Spokane Co., Washington, 14 May, 1893, Sandberg and Leiberg, n. 33. *Verbasculum* was a mediaeval name for the subgenus of rugose-leaved species of *Primula;* and the leaves of this western violet are as primula-like as those of the eastern *V. primulifolia* itself.

VIOLA MAMILLATA. Leafy and floriferous stems of the season upright and slender, 4 to 7 inches high above a long ligneous partly subterranean and horizontal rootstock clothed darkly with dead remnants of stipules of former seasons: petioles and peduncles long and slender, the whole plant glabrous except as to a line of hispidulous short hairs on the veins of many leaves beneath: leaves from broadly cordate and ½ inch long in the earliest, to subcordate-oval and 1½ inches long in the later, all obtuse and lightly crenate: peduncles bibracteolate not far below the flower, the bractlets linear, entire, exactly opposite: sepals small for the corolla, lanceolate, obtusish, not venulose: corolla ¾ inch broad, violet, the limb of all petals round-obovate, obtuse, the odd one very retuse and rather larger than the others; spur long, straight, subcylindric, at the end abruptly narrowed into a distinct upturned mamilliform appendage.

Wet ground, under fallen timber, at Dyer Mine, Uintah Mountains, Utah, 30 June, 1902, L. N. Goodding, n. 1202 as in U. S. Herb.

VIOLA CORDULATA. Caulescent, low, the leafy stems 2 or 3 inches high, but peduncles often as long, bearing the flower above all other parts: herbage of thinnish texture, everywhere glabrous: leaves basal and upper cauline all much alike in size and form, cordate, obtusish, crenate, about ¾

inch long, more than ½ inch wide: peduncles bracteolate near the flower, the bractlets long, narrowly linear, herbaceous: sepals large for the corolla, lanceolate, acutish; corolla barely ½ inch long including the not very long but obtuse and slightly upturned spur, purple, the limb of each petal retuse or emarginate.

La Barge, Uinta Co., Wyoming, 27 May, 1894, E. Stevenson. Type in U. S. Herb.

VIOLA TIDESTROMII. Caulescent, low, only 3 or 4 inches high, with peduncles scarcely, or barely, equalling the leaves; herbage deep rather dull green, appearing glabrous, under a lens showing traces of a scaberulous pubescence: lowest leaves apt to be broader than long and subcordate, those larger and later almost orbicular, less than 1 inch wide, very obtuse, tapering to the petiole at the otherwise truncate or subcordate base, very plainly crenate: peduncles with large linear herbaceous bractlets above the middle, and opposite: sepals rather broadly linear, not acute: corolla light-violet, ¾ inch broad and well rounded, all the petals equal and obtuse; spur short, thick, obtuse.

Wasatch Mountains, Utah, in a low place near Ephraim Creek, 11 June, 1908, Ivar Tidestrom.

VIOLA OXYSEPALA. Thin and delicate member of the *V. adunca* group, 4 to 6 inches high, the flowers borne rather far above the foliage; herbage wholly glabrous: leaves small, cordate to oval, the earlier acutish, none any more than faintly crenate, the petioles long and slender: peduncles greatly elongated, almost filiform, bracteolate not far below the flower, bractlets very narrowly subulate, not opposite: sepals subulate-lanceolate, very acute, dark-green, veinless: corolla small for the group, pale, the petals all narrow; spur long, thick, curved upwards and obliquely acutish.

Wasatch Mountains, on slopes between Willow Creek and Ephraim Creek cañons, 15 July, 1909, Ivar Tidestrom.

Reconsideration of the Genus Marah.

It was the maturer opinion of the venerable Torrey that his once contemplated, though not in his day actually published genus *Megarrhiza* was better regarded as a peculiar section of *Echinocystis;* and this view soon afterwards met with the approbation of that specialist M. Naudin. When, now twenty-three years since (Pittonia, i. 1–3), I adopted that opinion, promulgated as it had been by two botanists far superior in age and experience, and myself transferred the Watsonian megarrhizas back to *Echinocystis*, I was unaware that this latter name itself had not the priority. Having discovered that *Micrampelis* of Rafinesque is the earlier name, and an entirely unobjectionable one, for the East American generic type, it was natural I should transfer the Pacific species and give them names under *Micrampelis;* and this was done (Pittonia, ii. 127–129).

The attempt, long persisted in, to hold the Pacific type as congeneric with the Atlantic and original *Micrampelis*, does not quite satisfy. As to foliage and as to flowers the two are indeed much alike; but in mode of growth, no less than as to form and duration of their roots, they are quite different; also as to the dehiscence of their fruits there is wide disagreement. Moreover, in the earlier of my two papers cited I find myself somewhat reprehensible in having described the seeds of the Pacific group as being "from nearly globose to much compressed." A seed, in order that it shall be describable as much compressed ought to be almost flat; and that is hardly true of the seeds of any of the Pacific species, although the variation of them, between one species and another, is not inconsiderable. But certain it is that no *Mara* has seeds approaching those of *Micrampelis* by any notable departure from the orbicular in outline. Even when somewhat compressed, they have never anything like that elongated melon-seed shape which helps to mark as distinct the Atlantic type. Add to these considerations the facts that all *Mara* species are perennial by enormous fleshy roots; that their seeds of such

distinctive form and outline have thick hypogeous cotyledons, and we have the characteristics of a genus naturally quite separate from *Micrampelis*.

The following is my census of the North American species of *Marah*, as far as they are known to me; though I may add that while yet an ardent resident student of Pacific Coast botany, I came to suspect that one or two of the accepted species were aggregates.

MARAH	FABACEA. Naudin	under	*Echinocystis.*
"	MURICATA. Kellogg.		
"	MACROCARPA. Greene	under	*Echinocystis.*
"	GILENSIS. Greene	"	"
"	OREGANA. Torr. & Gray	"	*Sicyos.*
"	GUADALUPENSIS. Watson	"	*Meganhiza.*
"	RUSBYI. Greene	"	*Micrampelis.*
"	LEPTOCARPA. Greene	"	"
"	WATSONII. Cogn.	"	*Echinocystis.*

An Oriental Convallaria.

CONVALLARIA JAPONICA. Rootstock short, very stout, densely clothed and even quite concealed by rather hard fibrous roots, its crown bearing a fibrous tuft, the remains of leaves of former seasons: leaves two only, subequal, elliptic, cuspidately acute, neither face with any trace of bloom, both of a bright, rather light green, the leaf as a whole of a notably fibrous anatomy: peduncle short, its summit scarcely equalling, or little more than equalling the bases of the leaves; raceme few-flowered, its bracts small, ovate-lanceolate, subscarious: perianth widely opening, broadly campanulate or almost saucer-shaped; stamens large, very short, the round-oval very obtuse anthers longer than the filaments.

All the Japanese material that I have seen answers to the above description, and is therefore by quite a redundancy of them, perfectly distinct from *C. majalis*. This oriental plant

has its nearest allies in certain species of the Virginian and Carolinian mountains of the southern United States, which have also, and without the slightest attention to their marked characters, been named *C. majalis*.

Nomenclature of the Bayberries.

When in 1894 I wrote the Bay-Region Manual I declined approval of that flagrant violation of fundamental principle by which our bayberries, otherwise called wax myrtles, came to be named as species of *Myrica;* for this name belongs of old to the tamarisk tree, a type known as *Tamarix* in most Latin-written botany of to-day. During three thousand years or more the name myrica recalled to every one who read or heard it nothing else but the tamarisk. It modern Greece the tree is still myrica, and even in Italy while in some provinces it is known as tamarigio, in others it is still known by its Greek name myrice. Neither Greeks nor Romans had any knowledge of our bayberry bushes.

It is little more than a century and a half since this senseless transfer of the classic name of the tamarisk of Europe to our American bayberries was proposed. I am justified in calling it a senseless transfer ; for, at least, to those who know the names of plants as they were anterior to 1753, to call wax myrtles myrica species is no better than it would be to write of oaks under the name of horse chestnuts ; and it is acting just as absurdly as any zoologist would be doing if, in writing about camels, he should call them sheep ; for camels are camels in whatsoever language one makes mention of them ; also sheep are sheep whether taken note of under this our English designation of them, or that of *oves* of the Latins, *probata* of the Greeks, or under any other name they bear in whatsoever speech of men. To illustrate further this eighteenth-century vice of the transference of generic names, I shall suppose that Linnaeus, who published our American genus of the raccoons as merely a long-tailed sort of bears, had had the zoologic

common sense to see that they were not bears, but of a distinct genus, and the genus in need of a name as such. Now *Ursus*, the Latin name of bear, being securely in place for the true bears, it would have been exactly like Linnaeus if he had picked up the Greek name for bears, which is *Arctos*, and had applied that as the scientific designation of those New World mammals, the raccoons. Thus, while to illiterate dabblers in zoology *Arctos* would have been a good enough generic name for our raccoons as distinct from the genus bear, still, to Greeks—yes, and to educated Romans as well, for they know Greek—Linnaeus would still be calling raccoons bears.

This hypothetic Linnaean transfer of the Greek name of bear to the raccoon is not an exact parallel to his transfer of *Myrica* to the bayberries; for it is confessed that raccoons and bears are not, after all, so very far apart taxonomically, while no one has ever pretended that tamarix and bayberry are closely akin. They are wide apart; so that such perversion of the name *Myrica* is, if possible, worse than it would have been to have applied the Greek for bear to the raccoon genus. No Greek of to-day, if, unacquainted with Linnaean tricks of nomenclature, he should open one of the Linnaean books at a *Myrica* page could at first glance have any idea that tamarix was not meant; and such Greek would be amply justified in his act, if he should throw the book into a corner as a piece of pretentious nonsense, after having discovered by reading the diagnosis, that some genus which Greeks never knew, had been designated by this their classic name for trees that had been known as myricas for some thousands of years.

In that book of mine which I have mentioned above, I entered one protest at least, against this abuse—this perverted use—of Greek generic names, and restored for the Californian species of bayberry the name *Gale*, which Tournefort had adopted in the year 1694 when the recognition of the genus was new, and it had become certain that, the ancients not having known the shrub, it had neither a Greek nor a Latin name. I called the fine large Californian bayberry tree *Gale Californica* (Man. p. 298).

Long after the publication of my book of San Francisco Bay botany, a student of the bayberries and their nomenclature came to me with the taxonomic proposition that the type species of Tournefort's *Gale* is generically distinct from the real bayberries; that *Gale* embraces only the European *Myrica Gale* of Linnaeus. On examination of the matter, under my fellow botanist's insistence, I am persuaded he is right about it, and so *Gale* will not hold for either my Californian species or for those of the Atlantic slope; and we—my friend and I—must go in quest of a generic name for our bayberry genus.

Realizing that one of my most daring disciples in the work of restoring natural genera in place of the artificial and complex genera of Linnaeus and of Bentham has written a large Flora in which, in my judgment, far better than Linnaean and Benthamian genera are set forth, I first of all consult this new Flora of the Southern United States, to see if this friend has also distinguished generically between the Old World *Gale* and the New World bayberries. I rejoice in the discovery that the name *Myrica* is not there at all. I am glad of its disappearance from another and an influential book, though I am far from venturing to credit Mr. Small with having rejected the name *Myrica* on those grounds upon which I myself, at an earlier date, had rejected it.

In this Flora of the Southern States I find a name for the bayberries which to me is brand new, the name MORELLA, and find it credited to Father Loureiro (1790). At first glance there is revealed in that name a definite hint of mulberries, for *Morella*, as a Latin word, can not seem to mean anything else but little-mulberry tree; either that or dwarf mulberry-tree. I understand, of course, the doctrine that no meaning is to be looked for in either the generic or specific term of any binary name of animal or plant. I am not far, I think, from a clear apprehension of how that proposition took its origin. However, that doctrine is not here under discussion. The fact is, that human intelligence, once tolerably well developed, inevitably scans the sense of any new name; looks to see, if possible, its meaning, and asks why the thing obtained that name.

No names seem to originate arbitrarily, and most names, even outside of zoology and botany as well, originally are framed to designate some mark or characteristic of the thing named; and so, I can not help seeing that the name morella points not to bayberries but to mulberries. By the name alone I am led to wonder whether in Cochinchina Loureiro can have found bushes or trees, allied to bayberry or wax myrtle, whose fertile aments develop, not into hard wax-covered nuts, but into pulpy drupelets. I consult the book and find even better reasons than I had guessed for Loureiro's having named his new shrub *Morella;* for he says its mature female aments are not only pulpy, red and appearing like mulberries, but are edible. He relates that the Chinese cultivate the tree; that in Cochin China it grows wild, with smaller fruits; that these are both palatable and wholesome; that the Chinese eat them raw; that Europeans in China preserve them with sugar; that the Cochinchinese cook them while immature, and that when ripe they make from them a wine which is not to be despised whether as to color, odor or flavor (Fl. Cochinch. p. 548).

It is always extremely venturesome to select out of the Kew Index any generic name that may have been demoted to synonymy by Bentham, without first carefully examining the original text of the publication of such genus. From the text of the author of *Morella* it becomes clear as day that no shrub or tree known in any part of America can be referred to that genus with the faintest semblance of reason.

What, then, are we to call our bayberries as a genus Latin-named? The false *Myrica* of Linnaeus must have for its type the genus *Gale* of Tournefort. My friend Mr. Small I seem to see must regard our bayberries as generically separate from *Gale*. I should most readily agree to that. But what is Mr. Small to call the Atlantic, and I the Pacific, bayberries? I recommend to my friend, and to myself, a further study of that column of Kew Index *Myrica* synonyms; also that we neither one pick up the name that seems next older in history, and run with it into print without knowing at all what such name does really stand for.

Two New Southern Violets.

VIOLA PLANIFOLIA. Related to *V. cucullata*, but slender white woodstocks short and erect, apparently not solitary but in clumps: plants a foot high or less, with about 3 or 4 leaves and 1 or 2 flowers: petioles and peduncles sparsely hairy, some hairs deflexed, others spreading: leaves deeply cordate, plane, small for the plant, the earliest 1 inch long, the latest 2 inches, thin, light-green, serrate-crenate, nearly or quite glabrous: peduncles far exceeding the leaves, bracted above the middle; sepals narrowly lanceolate, obtusish, plainly 3-nerved, entire, scarious-margined, their auricles hispidulous: corolla blue, nearly an inch broad; uppermost petals largest, strongly retuse, laterals narrower, retuse, the odd one broad, much shorter than the others: capsules oval, not greatly exceeding the sepals.

Thompson's Mills, Gwinnett Co., Georgia, 2 May, 1909, collected by H. A. Allard.

VIOLA ALLARDII. Akin to *V. cucullata*, also of wet ground, but the rootstock very short, stout and upright, bearing many whitish fibrous roots; both leaves and flowers numerous for this group, and the leaves short-petioled, surpassed by the flowers, yet the whole plant no more than 3 or 4 inches high: herbage rather delicate, yet subsucculent, glabrous in every part: lowest leaves reniform to broadly cordate, the later deltoid-cordate, acute, crenate: peduncles bracteolate much below the middle, the bractlets narrowly subulate-linear, ascending, entire: sepals lanceolate, acutish; corolla blue or purple, large, nearly an inch long, but petals all narrow, the odd one as long as the others, all obtuse, the laterals with a tuft of long flattish hairs.

Open and very wet land near Thompson's Mills, Gwinnet Co., Georgia, 1 April, 1909, H. A. Allard.

Though almost undoubtedly a member of the bog-meadow group of stemless species, this one has so nearly no rootstock at all, and displays so large a tuft of whitish fibrous roots as

to make it peculiar among its supposed allies. The specimens, though in full petaliferous flower, are nevertheless rather too young.

Three New Astragali.

ASTRAGALUS SUBUNIFLORUS. Near *A. Nuttallianus*, the root annual, stem slender, erect, simple, or branched only above the base if at all, mostly 2 to 6 inches high, canescent with an appressed coarsely silky pubescence, but upper face of leaflets sometimes almost glabrous, these in about 4 pairs, not crowded but rather remote on their rachis, in outline elliptic-oblong: peduncles filiform, nearly erect, usually 1-flowered, some of the later 2-flowered: calyx with short tube and much longer narrowly lanceolate-subulate teeth: pod somewhat shorter than in *A. Nuttallianus*, more acute, glabrous.

Near Tehuacan, Puebla, Mexico, 7 Aug. 1897, C. G. Pringle, n. 6678 as in my set of that collector's plants.

ASTRAGALUS PERTENUIS. Also near *A. Nuttallianus* and annual, branched from the base and these branches often more than a foot long, prostrate, slender, flagelliform, sparingly leafy, the whole plant, even to the pods, clothed sparsely with appressed straight hairs: leaflets in 3 to 5 pairs, remote on the elongated rachis, extremely diverse in form on each plant, those of the earliest leaves only a line long, cuneate-obcordate, those next them 3 lines long, oblong-cuneiform to oblong-linear and from truncate to acutish, uppermost foliage with linear acute or acuminate leaflets ½ inch long or more: peduncles filiform, shorter than the leaves, often 1-flowered, none more than 2-flowered: pods small, 3 to 5 lines long, appressed-setulose.

A Lower Californian species, known to me in flowering specimens from Los Angeles Bay, and in fruiting ones from Cedros Island, all collected years ago by Edward Palmer.

ASTRAGALUS GERTRUDIS. Allied to *A. fallax*, the slender decumbent stems less than a foot long; herbage canescently pubescent: leaves subsessile, leaflets oval to oblong, obtuse, retuse or truncate, ¼ to ½ inch long, in 7 or 8 pairs: peduncles equalling or surpassing the leaves; raceme short and dense, as much so in fruit as in flower: calyx short, subcylindric, 4 lines long including the short teeth: corolla purplish, twice the length of the calyx: pods rather less than an inch long, somewhat deflexed, almost lunate, very acute, coriaceous, obcordate in cross-section by intrusion of the lower suture, pubescent, sessile within the calyx.

Taos Co., New Mexico, 27 May, 1897, collected by Mr. and Mrs. Heller, n. 3598; distributed for *A. Greenei*, of which the pods are very different. The species is quite as near *A. fallax*. It is dedicated to Mrs. Heller.

The Genus Downingia.

A resolution was made by me some few years since to discontinue giving approval, and further currency, to a certain class of generic names, that is, such as are in the line of attempts to dedicate second, third, fourth or fifth genera to the same person. It is a new kind of procedure in nomenclature, this practice of dedicating, first a *Brittonamra*, then a *Brittonastrum*, then a *Neobrittonia* all to the same individual; and, while I have no great confidence in the validity of the late Asa Gray's genus *Greenella*, I myself am not so desirous of being commemorated by a genus, that I would countenance either the late Otto Kuntze's *Greeneina*, or the *Greeneocharis* of Gürke and Harms, even though *Greenella* should be merged in *Xanthocephalum*, from which I have never regarded it as any too distinct.

Now while I would not accuse those who seriously propose such names as meaning any dishonor to us whose names are thus familiarly used as nomenclatorial cheap conveniences, I still can not but remark that the really great names in

botany are not so abused. I have never heard that any botanical author, of however light mental equipment for name-making, was audacious enough to propound a new genus *Linnaeella*, or a *Linneanthus*, or a *Linneophytum*, a *Linneocharis*, a *Pseudolinnaea*, a *Macrolinnaea*, a *Microlinaea*, a *Neolinnea*, or any one of a score that might as cheaply be compounded. I think, also, that it would be the sense of botanists in general throughout the world, that this treatment of the name of Linnaeus in botanic nomenclature would be ignominious, and not to be tolerated. It is only third or fourth rate men like Dr. B., Dr. C. and myself, who have each a half-dozen genera, more or less, named so flippantly, and to our dishonor.

The name *Downingia*, as dedicated to Andrew Jackson Downing by John Torrey, was a merited honor to a great man. For the later displacement of that name, I am responsible. *Bolelia* of Rafinesque was found by me to antedate *Downingia*, and I published the fact. At the moment of doing this I felt a repugnance to the name, and this not so much because of its being anagrammatic. I have no serious objection to certain euphonious anagrammatic names for genera, except when, as in the case of *Bolelia*, they are constructed upon personal names; and this one is plainly a transmutation of the letters of *Lobelia*. It is in reality dedicating a second genus to Lobelius. On that ground I now object to it. That dislike of the name which I felt twenty years since when dealing with it was, at that time, overcome by my sense of the right of priority; a feeling which, during the vicissitudes of botanical nomenclature within twenty years past has been much weakened. In view of the multitudinous generic names of the most barbarian, or mongrel, or otherwise insufferable character that have been launched forth upon botanical public within these two decades, it is become inevitable that a check must be put upon the recklessness of those who publish any kind of a villainous generic name, feeling perfectly secure that, no matter what they issue for a name, priority will save it to the end of botanic time. A reaction

against priority, under these conditions, was sure to come. The beginnings of it are already felt in more corners of the earth than one.

I am aware that, in the case of DOWNINGIA there is another earlier name for the genus, that is, *Gynampsis* of Rafinesque. But in respect to this, and a few other like instances, I shall maintain that, when a botanical author makes a succession of generic names for the same generic type, he has forfeited all right to serious consideration in the matter of the nomenclature of such genus.

Since the time of Torrey and of Lindley, when it was first founded, the making of the genus DOWNINGIA has been mine by individual discovery and first publication of almost all the additional species now known; and I congratulate myself that all except two of my own discoveries were published under DOWNINGIA at the first. The two I here transfer.

D. HUMILIS. Greene, Pitt. i. 226, under *Bolelia*.

D. LAETA. Greene, Erythea i. 238, under *Bolelia*.

Miscellaneous Specific Types.—I.

CLAYTONIA CHRYSANTHA. Perennial, akin to *C. lanceolata* but smaller and more slender: globose corm of the size of a small pea, the whole plant barely 2 inches high, the pair of lanceolate opposite leaves located above midway of the stem; raceme very lax, only 3 to 5-flowered, their pedicels greatly elongated: corolla very large for the plant, nearly ¾ inch wide in expansion, deep-orange, the petals lightly obcordate: capsule and seeds unknown.

Moist sedgy southward slope of Mt. Baker, Washington, at 5,500 feet; collected by M. W. Gorman, 6 Aug. 1909; the special locality being at the east side of the Deming Glacier. I had a similar beautiful yellow-flowered plant from some place in British Columbia, two years since, the specimens having

been lent me by the late Dr. James Fletcher of Ottawa; but that, not a subalpine plant, may have been the *C. aurea* of Nelson.

SANICULA APIIFOLIA. Perennial by a stout fusiform root 1½ to nearly 3 inches long: stem solitary, 1 foot high or more, simple below, scarcely branched even above, the few branches more like peduncles and the plant strict in habit, glabrous: flowers rather showy and milky-white: ternate lowest leaves long-petioled, their segments broad, obtuse, variously but none sharply toothed: involucres of the flower clusters monophyllous but parted into ovate lobes, the whole whitish and almost scarious; carpels tuberculate, but each tubercle bearing a stout subulate rather short prickle hooked at tip.

Columbia Falls, Montana, June, 1893, also 1894, R. S. Williams. In every way, from root, and very parsley-like basal leaves up to flower, entirely distinct from *S. septentrionalis*.

TOXICODENDRON RUFESCENS. Shrub never climbing or forming aerial roots, firmly erect 1 to 1.5 m. high, copiously and amply leafy, bearing small clusters of rather small fruits; mature twigs and branches dull reddish-brown, rather closely lenticellate, glabrate, but the growing twigs, and even to the end of the first season, rusty-puberulent: petioles 5 to 8 cm. long, the compound blade about as long; odd leaflet exactly though quite broadly ovate, very acute or else abruptly acuminate, commonly entire, occasionally with 2 or 3 coarse teeth on one or both margins, 8 to 10 cm. long, 5 to 6 cm. wide below the middle, its petiolule usually 2 cm. long, upper face vivid green, glabrous, lower loosely hirsutulous on all veins and veinlets; lateral leaflets not much smaller than the terminal but notably inequilateral, their petiolules very short, barely, or hardly, 3 mm. long; panicles of fruit 5 cm. long or less, the branches and main rachis all slender; drupelets small, nearly spherical, a trifle elongated, glabrous and polished, only obscurely striate.

The original and only specimens of this new *Toxicodendron* are sent by Mr. H. Walton Clarke, without mention of special

locality or notes of environment; so that for type station one may only cite the vicinity of Lake Maxinkuckee, Ind. The collection of the specimens was made by Mr. Clarke on Sept. 14, 1906. That part of the characterization, however, which relates to height of the shrub, and its upright habit, is but a repetition of Mr. Clarke's note upon this point.

The species has a near ally in New England, namely, the *Toxicodendron glabrum* of Philip Miller (1768), long unrecognized; also somewhat recently republished as *Rhus littoralis* Mearns.[1] The New England shrub has a much firmer texture of foliage, and the very scanty pubescence of the lower face of the leaf is of altogether different character. The panicles are larger, with much more numerous drupelets, and these notably large, as well as somewhat pubescent.

PYRROCOMA CHEIRANTHIFOLIA. Low perennial, stout taproot and branched crown or caudex devoid of woolliness: basal leaves many, not rosulate but erect, linear-lanceolate, entire, acute, some of the earlier rather broader, narrowly lanceolate, remotely and lightly serrate-toothed: stems scapiform, only 5 or 6 inches high, strongly decumbent, scarcely leafy, usually monocephalous, occasionally with 2 heads, obscurely villous-arachnoid: involucres turbinate, hardly a half-inch high, their bracts in about 3 series, narrow, acute, largely green-herbaceous, lightly villous-arachnoid; rays many, large and showy for the plant.

Common in fields along San Pete River, west of Ephraim, Utah, 7 Sept. 1907, Ivar Tidesdrom, n. 534 as in U. S. Herb.

ARNICA ABORTIVA. Of the size and habit of *A. cordifolia*, but foliage small: basal leaves not seen, the cauline in about 3 pairs, ovate and deltoid-ovate, dentate, firm, scaberulous and sparsely pubescent on both faces, only 1 to ½ inches long, the very lowest on long naked petioles, the others on shorter ones broadly winged: heads 1 to 3, on long naked or bibractrate peduncles: involucre campanulate, ¾ inch high, the bracts biserial, the outer lance linear: acuminate, villous-hirsute, the

[1] *Rhus littoralis*, Mearns, Proc. Biol. Soc. Washington, Vol. 15: p. 148 (1902).

inner narrower, either wholly hyaline, or with only a green midvein, rays short, yellow, their ovaries altogether abortive: disk-corollas with tube and subcylindric throat of about equal length; the former villous about the summit: achenes slender cylindric, striate, hirsutulous; pappus dull white, barbellate.

Open woods in the Wind River Mountains, Wyoming, Dr. W. H. Forwood, 23 July, 1881. Type in U. S. Herb.

ARNICA PARVIFOLIA. Woodland plant of low stature and from horizontal rootstocks; pair of basal leaves cordate, more than 2 inches long, on slender petioles about as long, acutish, repand-denticulate or dentate, thin, green, both faces with a few scattered short hairs and minute glands; stem leaves in about 3 pairs, lanceolate or ovate-lanceolate, small, the blade seldom more than 1 inch long, sessile in the upper pair; head solitary, or rarely 2 or 3, large, short, peduncled; involucre campanulate ¾ inch high, of about 10 thin linear-lanceolate acuminate, bracts more or less villous and glandular on the back: rays large and long, about 12 or 14, yellow: achenes slender, sparsely setulose; pappus firm and delicate, white, barbellate.

Peculiar small-leaved and even leafy-stemmed ally of *A. cordifolia*, the type specimens in my herbarium from Marshall Pass, Colo., 19 July, 1901, by C. F. Baker, n. 515.

ARNICA LASIOSPERMA. Apparently cespitose, slender and low, in maturity only 6 inches high, firm and wiry rather than succulent, not obviously pubescent, the stem and leaf margins under a lens showing scattered hairs: leaves small, the cauline in 2 or 3 pairs, oblong-lanceolate to lanceolate, acute, entire, sessile: heads 1 to 3, on peduncles 2 inches long; involucres campanulate, of 10 or 12 oblong-lanceolate merely acute bracts: rays rather long, light-yellow; disk-corollas with densely appressed-villous short tube and about equal subcylindric glabrous limb: achenes cinereous with a dense fine appressed pubescence; pappus white, barbellate.

Subalpine in Estes Park, at base of Long's Peak, Colorado, 26 Aug. 1895, Geo. E. Osterhout.

Studies of Thalictraceae.—I.

It is not as the name of a suborder, or subfamily, but as that of a proposed natural family of plants that I write THALICTRACEAE. I have long carried in mind a conviction that certain genera, *Thalictrum* heading the line, have not the least natural affinity for, or genetic relation to *Ranunculus*, or to *Clematis*, to *Anemone*, to *Delphinium*, or to *Paeonia*. I do, however, seem to see what to me are marks of real genetic relationship among such genera as *Thalictrum*, *Anemonella*, *Isopysum*, perhaps *Coptis*, and more indubitably *Aquilegia*. My own idea about a rather intimate relationship as subsisting between the last named genus and *Thalictrum* found expression many years since in my books of Californian botany, wherein, removing *Thalictrum* afar from where all the Jussieus, De Candolles, Benthams and Englers of a hundred years and more had placed it, that is, on the *Clematis* side of *Ranunculus*, I located it away on the other side, and in closest juxtaposition to *Aquilegia*. I gave then no reasons for such protest against fossilized artificialism, nor shall I give reasons here.

Thalictrum itself falls into a number of groups so very unlike each other as to flower and fruit that doubtless the time is coming when segregate genera, a half-dozen of which have already long since been proposed, will be freely admitted in place of the conventional *Thalictrum* of the books that we have. Such an event, when it comes, will accentuate the demand for a recognized family of the THALICTRACEAE.

Engaged seriously in the investigation of this aggregate *Thalictrum* for now more than twenty years at intervals, I have given a closer application to it during the last three years than I ever gave to any other genus, but hitherto with but few results that are to me quite satisfactory ; and I have come to feel that it is the most difficult of all the phanerogamous genera of the North American flora. Also I find no evidence that other students of the group have even dimly apprehended

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the most perplexing difficulties that its forms present. Has any one hitherto confessed a suspicion that, in our dioecious species the leaves are of one description in the male plant, and of quite another form in the female of the same? They are often very large plants, insomuch that nothing gets into the herbarium but the inflorescences and one or two of the upper cauline leaves. Familiar with many hundreds of herbarium sheets of this kind of material, I am driven well towards a state of hopelessness by the discovery that in one and the same individual, the basal leaves, such as seldom get into the herbarium, may be found to be perfectly glabrous, while the middle and upper cauline are notably or even strongly pubescent. With facts like these confronting me, and many more as perplexing, I am daily and hourly face to face with the discouraging circumstance that, among scores of reputable botanists who have endeavored to describe the species, there are still no descriptions of any species in the older books, or even in the newer monographs. This last named fact, however, has confronted, and has been the despair of, a number of good botanists; and these will be found to have taken up one name for a supposed species at one time, then dropped that and taken up another name for it, because this other later name seemed to carry with it something a little more like an intelligible description of a plant.

The present paper is devoted mainly to some results of a long and careful study of our white-flowered kinds of *Thalictrum*, all of which have usually passed for a single species, and under a name that has varied from generation to generation. With early and middle nineteenth-century writers the name was *Thalictrum Cornuti*. After the suppression of that appellation the name *T. polygamum* came into vogue, and most of the specimens in herbaria that are recent have the latter name on the labels; while in one or more of the twentieth-century books of American botany *T. corynellum* has displaced *T. polygamum*. An abstract of the history, and the real or supposed reasons for these consecutive changes of name may well find place here.

The earliest trivial name in any way representing an American white-flowered member of this genus is the *Thalietrum Canadense* of Cornutus. It is of the year 1635. That author's using an *e* rather than a *c* in the second syllable of the generic name bespeaks a doubt that existed in the minds of earlier botanical scholars as to whether the name was intended of old to be *Thalietrum* or *Thalictrum*. For almost two centuries the validity of *T. Canadense* was unquestioned. Tournefort, like others of his time, sustained it, and of course under the name at first assigned. Linnaeus in his day suppressed the then well established *T. Canadense* and renamed the species *T. Cornuti*. The change was as arbitrary as possible, yet the new name became current almost everywhere; and in, I think, all American books of botany down to the beginning of the last decade of the nineteenth century. During about 140 years, then, every kind of tall panicled meadow rue displaying clavate white filaments was named *T. Cornuti*; then all at once, and with little by way of apology, the best known of American botanists dismissed the name *T. Cornuti* and put in its place *T. polygamum*, a nomen nudum printed long, long ago by Muhlenberg. From 1895 forward to the present, books and catalogues sustain, on the mere word of Gray, the name *T. polygamum*. This is an outline statement only, and appertains to the history of the nomenclature of this type in our own country more particularly; but the aggregate species had been studied with care nowhere but in Europe; and we shall have to look to one of the greatest botanists of Europe to see what the real reasons were for suppressing Linnaeus' trivial name *T. Cornuti*. Asa Gray tells us (Syn. Fl. I, 18) that the necessity of this had been suggested by De Candolle (1818). This eminent botanist appears to have been the first to critically examine the page and plate of Cornutus, and in doing this he could but discover that both plate and description apply to no other plant but the Old World *T. aquilegifolium*. *T. Canadense* of Cornutus, Tournefortius and others, as well as *T. Cornuti*, Linn., were but synonyms of *T. aquilegifolium*, and all must be suppressed.

This he did, giving the Canadian plant the new name of *T. corynellum*. When eighty years later Gray discovered all this he, in his zeal for priority, suppressed the name *T. corynellum* which was perfectly valid, as being accompanied by a description, and forced to the front that nomen nudum, *T. polygamum*, Muhl.

The botanists in general must have inferred this resurrection of the Muhlenbergian adjective to mean that it was an older equivalent—and a sure and certain equivalent—of *T. corynellum*. The truth is, it can never be proven the equivalent of anything. All that is said of the plant is that its corolla is white, that it is polygamous, and also glabrous. About the stamens not a word is said over and above what is implied in the term polygamous; and polygamous is an extremely empty term to try to make any use of in defining a species, for it is a mark by which no individual specimen can be determined. To know a polygamous species to be such, one must have at least three individuals, a male, a female, and an hermaphrodite. *T. polygamum* is certainly no better than a nomen nudum. Moreover, it is so far from having been meant for a new designation of Linnaeus' *T. Cornuti* that Muhlenberg admits this last as a valid species separate from his *T. polygamum;* and still further, he attributes to another species flowers as white as those of his *T. polygamum*, that is, *T. rugosum* of Pursh. Then, to make matters if possible still worse for the status of *T. polygamum* as a tenable name of any white-flowered *Thalictrum*, Sprengel, the first to print Muhlenberg's *T. polygamum* name with an accompanying description, says of its filaments that they are filiform. A German, and a contemporary, and presumably a correspondent of the German Muhlenberg, must have had the means of knowing what the latter had had in mind under that nomen nudum which he had caused to be printed. So then, the very first paragraph or even line of description of *T. polygamum* ever printed (Sprengel, Syst. II 671) must lead the careful investigator, if to any conclusion at all, to that of Sereno Watson and some others, that what Muhlenberg had was nearer *T. purpurascens*, and probably

identical with that (see Wats. Index, 26). It is to be noted that De Candolle (Syst. I, 173) had without doubt or hesitancy so referred it, save as having distinguished between *T. purpurasceus*, Linn., and his own *T. revolutum*, under which latter he writes *T. polygamum* as a synonym. But this name, having been printed without diagnosis, and therefore without title to the rank of a plant name at all, ought to be excluded even from synonomy, because it can not be connected with any species whatsoever except by guess. This however is not quite so nearly true of *T. Cornuti*; for in the publication of this name an earlier name was cited, and this earlier one was accompanied by a description so full and clear as to leave no doubt that such description was drawn up from a specimen of *T. aquilegifolium*. But, to write down *T. Cornuti* as a mere synonym of this Old World plant and leave the matter so, is to falsify the situation by leaving untold one significant item of scientific truth which stands in this connection. It is quite certain that Cornutus had in his garden at the time a *Thalictrum* from Canada, almost as certainly a white-flowered one, therefore one which might by any piece of oversight or carelessness become confused with the white-flowered variety of *T. aquilegifolium*. It is not important that it should be shown how, or by whose mistake, the fruits of *T. aquilegifolium* came to be described by Cornutus for those of his *T. Canadense*; but the plant from Canada—almost certainly sent from Quebec, and by Dr. Sarracenius, the botanical correspondent of Parisian botanists of the time—was not ephemeral in European gardens. It remained there for more than a hundred years, and may still be there. Hermann in Germany, and Morison and Ray in England, as well as Tournefort and others of the time knew, and distinguished, between *T. aquilegifolium* of Europe and *T. Canadense* of America, all these as subsequent to the time of Cornutus, yet in the same century. Then among contemporaries of Linnaeus in the century following, they had the plant in Germany and in England still, always distinguishing it from its European ally. Philip Miller describes both species, and, suppressing Linnaeus' name *T. Cornuti*, restores to the species

its original appellation. Thus it is clear that even if Muhlenberg's *T. polygamum* could have been a really published name, it would have had no status. It would have been long antedated by *T. Canadense*, Mill., and the same is true of *T. corynellum*, DC. Again as late as 1794 Moench has the two species in the Hortus Marburgensis; and he too rejects the name *T. Cornuti* and lists the plant under his own new appellation of *T. confertum*, which also again antedates by many years Muhlenberg's nomen nudum.

The plant of the upper St. Lawrence, frequent on both the Canadian side and on ours, the *T. Canadense*, Mill., also better described by De Candolle as *T. corynellum*, I shall not here describe anew; but I recognize it well, and am able to distinguish from it not only the excellent *T. dasycarpum* of Fischer, but also the following, all from regions well to the westward and southward of eastern Canada and northern New England.

The group as a whole is most unlike the Old World *T. aquilegifolium* and its allies, as is proven by its extremely different mature carpels. De Candolle well distinguished as a marked subgenus, under the name *Tripterium*, the Old World plants. It is quite as fitting that these American plants, in both flower and fruit so very different from *Tripterium*, should be designated at least subgenerically as LEUCOCOMA, in allusion to their often massive and always beautiful white panicles. The whole group is aestival in its flowering, while our more than equally numerous species with green flowers are vernal. In respect to a number of the species there exists in the herbaria no evidence of their being other than dioecious, no hermaphrodite specimens occurring. Such plants I find to have been commonly mistaken for the dioecious *T. purpuracens*, so little discrimination is made by people in places of some supposed authority, the clavellate filaments being overlooked altogether. Again: while in the greater number of species the achenes are black when ripe, and the green herbage of them blackens in drying, there is one set of them marked by herbage the color of which is green in the dry, and by achenes that are only of an olive-green when perfectly mature. As to

differences in size, amplitude of panicles, forms of leaflets and characteristics of them as to texture, venation and pubescence, the whole genus outside of it is scarcely more diversified than is the LEUCOCOMA section in itself. Also its species range all the way from subarctic Labrador to Georgia in the southern United States, and from the Atlantic seaboard to the Rocky Mountains.

THALICTRUM BISSELLII. Slender, sparsely leafy, 2 feet high, the solitary basal leaf petiolate, the several and remote cauline sessile; stems terete, scarcely angled or striate: leaflets of lowest leaf of staminate plant glabrous on both faces, glaucous-green above, very glaucous beneath, suborbicular, 7 or 8 lines wide, subtruncate or subcordate at base, slightly and not very unequally 3-lobed at apex, with middle lobe about twice as broad as long, truncate, but, by two slight indentations broadly 3-crenate, the terminals and laterals little different save as to size; upper leaves of same staminate plant sparsely and minutely pubescent beneath: leaflets of pistillate plant rather longer than broad, more deeply 3-lobed, the middle lobe rounded at apex and perfectly entire; sepals of staminate plant obovate, obtuse, of pistillate equally obtuse and more rounded, almost orbicular: filaments short, clavellate almost from the base, much narrower at their widest than the short oblong-oval anthers: immature achenes small, slenderly fusiform and stipitate.

Type specimens collected in 1897, in the middle of July, at Southington, Connecticut, by C. H. Bissell, whose label records it as common there in wet meadows. The specimens are with me as a loan from the herbarium of the Agricultural College of New Mexico.

For a member of this white-stamened group this is a small one, the plants not larger than some of the largest of *T. dioicum*, and is quite as sparingly leafy as that is in its larger growths. The sheet of specimens is a remarkably complete one, bearing a complete staminate and a complete pistillate plant, each in flower, with also an inflorescence of the pistil-

late in nearly full grown fruit. The herbage does not in the least blacken in drying, though the immature achenes have blackened.

By the care with which Mr. Bissell gathered and pressed these complete plants, I feel assured that the male and female represent the same species precisely, and by their completeness they demonstrate fully how the foliage between a male and a female may differ, as well as how on the same individual the lowest leaves may be perfectly glabrous, the others very notably pubescent.

THALICTRUM VIRIDE. Tall and robust, the ample subcorymbose fruiting panicle nearly a foot in breadth; whole plant, even to the mature carpels, of a deep green, in no part dull or dark when dry; petiolules with a few hairs, all other parts glabrous; leaves ample and open, one of the cauline 9 inches long and (from tip to tip of the basal pinnae) 15 inches broad, the primary petiolules 3 or 4 inches long below the first leaflets, all the petiolules primary and secondary very firm, leaflets very firm, light-green above, with veins still lighter, beneath paler and more prominently veiny; terminal leaflets of round-oval general outline, 1 to 1¼ inches long, obtuse at base, the apex with one large and two small lobes all mucronate-acute; laterals mostly similar but small, only a few oval and entire: achenes about ¼ inch long including style and short thick stipe, thick-fusiform, the thickest ribs often showing a few small setaceous erect hairs.

Type specimens, in U. S. Herb., from Waterbury, Connecticut, where they were collected by C. G. Du Bois, 30 Aug. 1888.

THALICTRUM SETULOSUM. Plant stoutish, a yard high or taller, the stems smoothish and quite glabrous throughout: leaves of firm texture, glaucous-green above, more glaucous beneath, both faces in a degree, but chiefly the lower, minutely and sparsely setulose-hairy: terminal leaflets of lower leaves more than an inch broad and long, rounded or subcordate at base, somewhat deeply 3-lobed, the middle lobe

largest, often unequally 3-lobed, laterals smaller, not always oval and entire; leaflets of upper leaves more elongated and narrow, also more acutely lobed, all leaflets strongly veiny beneath, less conspicuously so above: all plants probably more or less hermaphrodite, the flowers of the more fertile mostly with one or two stamens, often with none, their sepals caducous, those of the more staminate plant large, elongated-oval, somewhat persistent and deflexed; filaments very long, clavellate only above the middle and not strongly so, anthers very short in proportion, oblong-oval: immature carpels very minutely setulose, the mature less obviously so, very large, somewhat oblong-oval but obliquely so, the opposite ends being manifestly a little curved in opposite directions, neither quite sessile nor notably stipitate, not black, but dark greenish brown, the ribs rather low.

The type sheets of this species are in my own herbarium, and were collected at Monkton, Vermont, in July and September, 1880, by C. G. Pringle. The species is named in allusion to the short but bristly nature of the pubescence, the like of which I have met with in no other meadow rue. Its achene has a peculiar outline for a member of this group.

THALICTRUM MORTONI. Probably at least a yard high and not slender, the stems striate, glabrous, purplish: lowest leaves a foot long, the breadth somewhat less, the leaflets uncommonly large, doubtless of firm texture in age, not blackened in drying, of a rather deep green above, paler and glaucescent beneath and with a few rather prominent but slender and only slightly divergent veins, both faces glabrous; terminal leaflets 1½ inches long, 1 inch wide far above the middle, obtuse at base, sharply yet not deeply 3-lobed at summit; laterals mostly 1 inch long or less, obliquely ovate to lance-oval, acute, usually entire: sepals of staminate plant obovate, very obtuse, of the pistillate oval, acute; filaments only slightly clavellate, and that from near the base, in no part as wide as the narrow linear oblong acute anthers: neither mature nor even full grown carpels known, those half grown fusiform, glabrous.

Known only from western Ontario, near Wingham, where it was collected by J. A. Morton, 13 July, 1890, the specimens in Herb. Canad. Geol. Survey.

THALICTRUM ALTISSIMUM. Plants very tall, often 6 feet high and even more, the stems erect, rigid, manifestly angled, dark with minute purple dots, glabrous to the summit, and even as to the branches of the panicle and pedicels of the flowers: basal leaves a foot in diameter exclusive of the petiole, this glabrous, but the ultimate petiolules plainly hirtellous: leaflets firm, deep green, smooth and glabrous above, beneath yellow-green and, especially along the veins, softly hirtellous, the margins revolute, terminals an inch long, round-obovate or subcuneate-obovate, either subcordate or nearly truncate at base, 3-lobed at apex, the middle lobe thrice as large as the laterals, all lobes conspicuously cuspidate-mucronate, lateral leaflets either oval and entire, or some of them broader and with one lateral lobe or tooth: sepals of staminate plant obovate, obtuse, white, of the fertile plant more elongated, acute: filaments all clavellate and erect; anthers oblong, very obtuse: achenes black, small for the plant, sharply ribbed, tipped with the persistent straight style.

This is the common summer-flowering white-stamened meadow rue of river banks and other wet places in Virginia, Maryland and northward into Pennsylvania. It flowers along the banks of the Potomac all through July, and its fruit ripens in August, and is black as soon as ripe. Both the leaves, leaflets, flowers and fruits are remarkably small, the plant itself among the very largest of its genus, and of a lax and poor aspect on account of the wide spread of the nearly naked branches, these floriferous at the ends only. They are nearly divaricate; and the lax open panicle itself often measures two feet or more from base to summit, yet, from its laxity and openness, is ill defined as an inflorescence. In this particular our plant of these Middle States is very unlike all far northern and northwestern and western plants that have, with this, been mixed up from early times under the name of *T. Cornuti*, and more recently under that of *T. polygamum*.

THALICTRUM PERELEGANS. A yard high, or taller, the green and somewhat polished stem finely striate above the middle, glabrous, very leafy up to the rather naked and not ample panicle; leaves large, none but the uppermost sessile, all of thin and delicate texture; outline of terminal leaflets broadly to rather narrowly obovate, obtuse at both ends, with three rounded lobes at summit, the large middle one notably mucronate, laterals often only smaller, but sometimes obliquely oval and entire, all of a deep blue-green above, very pale beneath and there bearing traces of a minute scattered pubescence, also rather prominently venulose: sepals of the more fertile plant orbicular, white, of the more infertile larger, somewhat elongated: filaments very long, also very gradually clavellate from near the base and not wider than the very short oval or oval-oblong anthers: achenes rather small, elliptical, black in maturity, all deflexed, those of the more fertile plant very shortly stipitate, of the more staminate on a very long filiform stipe.

A large but elegant species, known to me only as in my own herbarium, and as collected by my friend Thos. H. Kearney, at Lemon's Gap in the mountains of eastern Tennessee, in early September, 1897. Strictly of the white-stamened group, only the carpels blacken in drying, all other parts retaining perfectly their fine blue-green coloring. The deflexed attitude of the achenes is not so remarkable as is the fact that the about four of them that are in each bisexual flower are very conspicuously and slenderly stipitate. I judge this to be a woodland species; but the labels bear no notes of habitat.

THALICTRUM HEPATICUM. Stem tall, terete without striae, smooth, glabrous, purplish, without bloom: lowest leaves very large, a foot long and of somewhat greater breadth, of 120 to 140 rather small mostly deeply and subequally 3-lobed leaflets that are bright green above, glaucescent beneath and glabrous throughout, firm of texture and not revolute; terminals hardly an inch wide, of the same length, subcordate,

lobed almost to the middle, the lobes broadly ovate, obtuse but cuspidate-mucronate; some laterals like the terminals in form but smaller, others ovate, obtuse, entire or else with one small lateral lobe or tooth: panicle of staminate plant nearly naked, rather contracted: flowers (only the staminate plant known) white, with round-ovate obtuse sepals and many long stamens; filaments pronouncedly clavellate but only above the middle, below that quite capillary and contorted; anthers short-oblong, abruptly very acute.

Swamps of the Blue Ridge Mountains, northern Georgia, 10 July, 1900, Albert Ruth. Very marked species; as to foliage most of the leaflets closely imitating those of *Hepatica*.

Certain American Roses.

In the course of two thousand years' history of the genus *Rosa* perhaps no more remarkable taxonomic discovery was ever made than that which fell to the lot of Dr. C. C. Parry and his party in 1882, when, botanizing along the seaboard of the Mexican Territory of Lower California, they came upon that unknown shrub which Dr. Engelmann soon after published as *Rosa minutifolia*.

In general appearance that shrub is far removed from all other roses that were then known, insomuch that I much doubt whether such experienced botanists as those discoverers were would have seen in it a member of the genus *Rosa* at all, if the bushes had been devoid of all traces of buds, flowers or fruits; for it is only by its answering, as to flowers and fruits, to the artificial phytographic technicalities which are allowed to be definitive, that *Rosa minutifolia* is admitted to that genus.

During some fifteen years this Lower Californian curiosity remained practically a monotypic subgenus. Then in 1897, not much less than a thousand miles inland from the Mexican

seaboard, Mr. Wooton discovered in the mountains of New Mexico, at elevations of 5,000 to 6,000 feet, what he regarded as a second member of this strange group, and he published it as *Rosa stellata*. There are contrasts more pronounced than have hitherto been indicated between the Lower Californian shrub and that of the Organ Mountains in New Mexico. Let us indicate these somewhat formally.

R. minutifolia. Young twigs with sparse and short pubescence: larger spines not much dilated at base, of dull color and notably pubescent: leaflets 5, not crowded, but the pairs equidistant: stipules with narrow subscarious body and divaricate foliaceous auricles.

R. stellata. Young twigs with copious stellate pubescence: spines much dilated at base, glabrous, white, polished: leaflets mostly 3, crowded at end of short rachis: stipules with very narrow body and ample foliaceous auricles divergent.

The excellent specimens of *R. stellata* distributed by Mr. Wooton are from two separate and rather well isolated mountain ranges in southern New Mexico, and he has noted clearly enough some of their divergences in his paper on them (Bull. Torr. Club, XXV, 152). Nevertheless, I seem to see that the discoverer of the New Mexican shrubs, in his diagnosis, has been betrayed by those curious trichomes of this type into the making of a synthesis which, on the whole, can hardly meet with general approval among students of roses. In other words, the *Rosa stellata* of the Organ Mountains and that of the Sierra Blanca are so very different in characters of stem, spines, leaves and indument that, on principles well established among rhodographers, they must be held specifically distinct. No expert in the knowledge of roses, contemplating figures 3 and 6 of Mr. Wooton's plate (Bull. Torr. Club, t. 335) would say that those two leaves, if taken from two plants from different regions, or even from the same hillside, are of the same species. The leaflets of one leaf are 5 and cuneate-obovate, notched all around the upper part from the middle or even from below that. Those of the other leaf

are 3 only, each being exactly triangular, notched only across the line of the truncate summit. The stipules also of the two are constantly very different. But it will be profitable to make exact diagnoses of these two plants; and first of all, there needs to be given a fuller statement of the characters of the typical Organ Mountain plant, to which alone, as the specimens before me seem to show, the name chosen applies.

R. stellata, Wooton (restricted). Stems when growing scarcely armed with other than white broad-based white prickles, but hoarily stellate-tomentose by trichomes radiating around a low murication or obsolete prickle: leaflets of the very short leaves mostly 3, sometimes 4 or 5, all alike triangular, entire on two sides, deeply toothed across the truncate summit, pubescent on both faces, also closely and minutely somewhat pustulate-roughened above; stipules proper very short, surpassed by their large foliaceous auricles.

The contrast between this and the shrub of the White Mountains (or Sierra Blanca, as the name of that range ought always to be written) may be shown by a diagnosis of its stem and leaves quite as brief as the above. I shall call it

Rosa mirifica. Growing stems light-green without stellate or any other hairiness, the few stout white prickles supplemented by very many intervening short almost filiform recurved and gland-tipped prickles: leaflets more commonly 5, of at least twice the size of those of *R. stellata*, strongly cuneate-obovate, strongly crenate-serrate around the obtuse apex, glabrous on both faces, not in the least pustulate or roughened; stipules long, wholly herbaceous, their small divergent or subfalcate auricles not notably foliaceous, the whole stipule marginally beset with small sessile glands.

This account of the leaves of the Sierra Blanca rose does not quite harmonize with the figure above referred to; for the figure shows leaflets more obovate and less cuneate, and with sharp rather than obtuse teeth, an indentation that could not be called crenate-serrate. But such as I have described here are the leaflets on two good sheets, one in the National

Museum, and one in my personal herbarium, both as collected by Mr. Wooton in the Sierra Blanca.

There is now before me a third representative of this strange group of roses, and this from a region to the southward of New Mexico, taken by a zoological traveler in another isolated range, the Guadalupe Mountains of Texas. In compliment to the discoverer of it, I name the species

ROSA VERNONII. Next of kin to true *R. stellata* but growing twigs, also the peduncles, appearing retrorsely villous-silky; large spines more slender than in any of the foregoing, also not notably dilated at base, conspicuously deflexed, white and polished, numerous stout but short gland-tipped hairs or bristles intervening; leaves nearly all trifoliolate, glaucescent, nearly glabrous, faintly pustulate above; leaflets notably dissimilar, the terminal much the largest and cuneate-obovate, the small laterals not cuneate but obliquely oval, all deeply crenate almost all around, the crenatures broader than high and themselves glandular-dentate; calyx closely villous-hirtellous, also armed with a few stout prickles.

Known only as collected in the Guadalupe Mountains, Texas, by Mr. Vernon Bailey, 15 Aug. 1901, the specimens in flower.

Old twigs of this rose show a roughness made up of short stout points, quite as in *R. stellata*, and the whole secret of the villous appearance of its pubescence is this, that the trichomes are developed here on only the lower or earthward base of the short prickles, and these are so crowded that the hairs, somewhat elongated, overlap.

I append characters of another new rose from the far Northwest.

ROSA ALCEA. Dwarf and apparently compact, the branches, and especially the flowering twigs copiously spinescent, the spines all rather slender, straight, ascending, or on older branches the larger and more persistent almost divaricately spreading, but none deflexed or even recurved: leaves small,

of about 7 or 9 leaflets, these obovate, obtuse, closely serrate, green and nearly or quite glabrous above, glaucescent and soft-pubescent beneath; stipules broad and short, the petiolar vein beneath with a few firm spines, their margins more or less glandular-ciliate: flowers solitary, the short petiole sparsely armed with gland-tipped spines; calyx-tube with not a few stout sharp spreading spines, but sepals quite densely glandular-prickly; corolla large, the petals obcordate.

Species known only in good flowering branches collected at Moose Jaw, Assiniboia, by Mr. William Spreadborough, in June, 1892, and communicated to me by Mr. J. M. Macoun. The Canad. Survey number is 10,624.

The type of my *R. Macounii* (Pitt. iv. 10) is also from Assiniboia, but is very different from this.

Some Allies of Hibiscus Moscheutos.

Taking Gray's Synoptical Flora for the authority upon our hydrophile kinds of *Hibiscus*, a northern botanist would believe without a doubt that the broad-leaved pink-flowered plant of New England marshes is to be *H. Moscheutos*, Linn. Nevertheless Linnaeus, who rarely distinguished species where they were not well marked, said that this northern plant should be called *H. palustris*. Its leaves are not only broad, but are lobed, and this with some suggestion of the outline of maple leaves. They say that the flowers of this, commonly of a pinkish or light rose-color, are sometimes white. But let the New England plant lover, taught that his northern plant is *H. Moscheutos*, come southward in summer time to the marshes of Chesapeake Bay and its tributaries, and he will be apt to ask what this hibiscus is that has always large cream-colored corollas, and with long narrow lanceolate and wholly uncut foliage; for he will not believe, unless his faith in great books is immovable, that this and the other are the same.

The northern plant is *H. palustris*. Only the great yellowish-

white southern one is *H. Moscheutos*, and it is improbable that any man, either botanist or botanophile, knowing both, will doubt their distinctness. Indeed, one of the most capable of northern botanists, though of an earlier generation, namely Bigelow, knew nothing of any other native hibiscus in Massachusetts than *H. palustris*. A living botanist of the North, and one well travelled, once asked me what this great cream-colored narrow-leaved plant of these southern marshes could be; so confident had he been that the maple-leaved red-flowered one of the North had been authoritatively determined by great men to be what they had called it; and he seemed to think that our plant of these regions must be nondescript.

I distinguish readily between *H. palustris* of brackish marshes northeastward, and an ally which it has on swamps bordering the Great Lakes far inland. But the center of distribution for these fine malvaceous plants seems to be much further southward; and a few species of them not heretofore defined are now described.

HIBISCUS OPULIFOLIUS. Stamens, petioles and peduncles pale, but with bloom rather than with pubescence, the substellate hairs being sparse: leaves 4 or 5 inches wide and scarcely longer, angulate lobed as in some maples and quite as in *Viburnum Opulus*, the lateral lobes at about midway of the blades and not prominent, the whole margin very regularly crenate-subserrate, upper face green, glabrous and remarkably whitish-veiny, lower face whitened, but not alone with pubescence, this being rather sparse: flowers solitary in the axils, on peduncles 3 inches long and twice the length of the petioles, from which they are perfectly distinct: bracts of the involucres long and triangular-subulate, of more than two-thirds the length of the calyx, this cleft to the middle, the lobes short-oval, cuspidate: flowers tinged with rose, not large, the petals about 3 inches long.

Ontario, on Point Pelee, Lake Erie, 23 July, 1892, collected by Mr. John Macoun. Very well marked by its broad maple-like foliage dark-green above and whitish veiny, as well as by

its whitish glaucous stems ; the whiteness being due to bloom, not pubescence.

In early August, 1901, Mr. Macoun again collected the plant at Leamington, not far from Point Pelee. There is also in U. S. Herb. a specimen by Alfred Ricksecker from the shore of Lake Erie in Ohio, at Vermillion, a point quite opposite to Mr. Macoun's Ontario localities ; so that the species is likely to prove the common, if not the only hibiscus of the Lake Erie marshes. It differs from *H. palustris* not only in respect to its comparative lack of pubescence. Its leaves are lobed below the middle, not above it.

HIBISCUS PLATANOIDES. Akin to *H. lasiocarpus*, but stem glabrous, leaves short-petioled and the blades not cordate but nearly as broad as long, not even acute, but lightly and unevenly angled after the manner of those of *Platanus occidentalis* and dentate like them, not serrate, about 3 inches long, often quite as broad, whitened and sparsely stellate beneath, dark-green and strigose-hairy above but not velvety : peduncles few and umbellate at summit of the stem only; bracts of involucres equalling the calyx, this cleft to the middle and the lobes triangular-lanceolate, very acute : corolla cream-color, 4 inches long, the petals not cuspidate.

South Pass, Louisiana, 20 June, 1900, collected by S. M. Tracy. The foliage as much like that of *Platanus occidentalis* in outline as can well be imagined. Mr. Tracy informs me that he could never identify it by any description extant.

HIBISCUS PINETORUM. Stems smooth and glabrous below, the upper part, together with petioles and peduncles dotted with scattered stellate or tufted short hairs : leaves long-petioled, the blade 3 to 5 inches long, ovate-lanceolate, with a pair of subhastate lobes at about the middle, above these acuminate and lightly subserrate-toothed, upper face dark-green and glabrous, lower whitened and closely pubescent, but on the veins beset with only scattered substellate hairs :

flowers in the axils only, the petiole and peduncle wholly distinct: bracts of involucres very short and somewhat spreading, not equalling the undivided part of the calyx, the lobes of this ovate, acuminate, distinctly parallel-veined: corolla 3½ inches long, cream-color, the cusps of the petals very prominent.

Wet pine barrens in the interior of Georgia, in Dodge Co., between the railway stations of Copeland and Rhine, R. M. Harper, 6 July, 1903, n. 1874 of his collection as in U. S. Herb.

HIBISCUS LANGLOISII. Stems glabrous below, pubescent in the middle: leaves equally soft-tomentose on both faces, dark above, lighter but neither whitish nor even hoary beneath, blades broadly subcordate-ovate, 3 or 4 inches long and quite as wide below the middle, abruptly acute, serrate-dentate, on rather spreading petioles 3 or 4 inches long: flowers on peduncles distinct from the petioles and 2 or 3 inches long; bracts of the involucre linear-acuminate, very long, quite surpassing the calyx, this cleft scarcely to the middle, the ovate acute lobes ending in a linear apiculation: corolla 4 or 5 inches long, apparently cream-color.

Banks of the Mississippi in extreme southern Louisiana, June, 1882, Rev. A. B. Langlois; distributed for *H. Moscheutos*, to which it is not allied so much as to the rather enigmatic *H. lasiocarpus*, Cav., although a number of quite different and distinct plants of our southern States have too irresponsibly been concluded under that uncertain species, about the habitat of which nothing seems to have been known.

Two New Lupines.

LUPINUS APRICUS. Annual, 1 to 1½ feet high, with few to several almost upright firm branches from near the base, these and the long ascending petioles rather shortly and

sparsely pilose: leaflets about 7, oblong-linear, acute, about 1 inch long, thin, sparsely appressed-pubescent: racemes subsessile, 2 to 3½ inches long in full flower, of about 4 or 5 verticils, these rarely indistinct: broad upper lip of calyx cleft deeply, the lower entire, the whole exterior appressed-villous but not densely so; corolla purple, broader than long, the breadth about $\frac{2}{5}$ inch; keel naked: pod 1 inch long, appressed-villous, 6-seeded; seeds not strongly compressed, obliquely round-oval, grayish with a few markings and many small dots.

A common species of middle California westward. I came to know it as undescribed the year before my field work in California came to an end, now fifteen years since. When it was sent me, in fine specimens, by Mr. Carl F. Baker, in 1902, I assigned it the name now given above. Mr. Baker distributed it, as his number 610. A fine array of other specimens is at this moment before me, gathered later, in 1908, from the original locality, by Mr. Charles Piper Smith, now of Logan, Utah.

Lupinus latissimus. Perennial, subacaulescent, with stout upright scapiform peduncles more than a foot high and surpassing the leaves, the plant pale with a somewhat velvety tomentum, except as to leaflets, these rather silky: leaflets rather constantly 5 only, very unequal, but all of remarkable breadth, the largest 2 inches long, more than ¾ inch broad above the middle, in outline somewhat obovate-elliptic, cuspidate-mucronate: raceme of very large flowers 5 to 7 inches long, dense, subverticillate: upper lip of calyx very long and acute but deeply cleft, the lower little longer, entire: corolla about ¾ inch wide, purple, keel short and broad, scarcely falcate, strongly ciliate below the naked apex: young pods short, oblong, densely silky-tomentose.

Collected at the Tassajara Hot Springs, Monterey Co., California, in June, 1901, by A. D. E. Elmer. A lupine of unusual aspect and mode of growth, the leaflets few and remarkably broad.

Some Western Species of Arabis.

Every year of the last fifteen, by the arrival at my study table of several specimens of *Arabis* from the farther West, I have felt the desirability of a general summing up of the membership of this group of crucifers, in the form of a monograph; but the time for undertaking such a task still recedes. Meanwhile a new invoice of these plants having lately come in to me from northern California under promise on my part that I would try to identify and report on them, I have been impelled to make a renewed study of other material of this kind lying in the National Herbarium hitherto unexamined.

For my own convenience and that of others I shall first present a short bibliography of my own contributions to the knowledge of the genus made within the last ten or a dozen years.

A. rhodantha, Fendleri, Pitt. iii, 155. A. drepanoloba, l. c. 306. A. Albertina, arida, campyloloba, connexa, consanguinea, duriuscula, eremophila, formosa, gracilenta, gracilipes, maxima, oxylobula, oxyphylla, platyloba, recondita, rectissima, tenuis, Pitt, iv. 189–198.

A. Austinae, Covillei, epilobioides, inamoena, Leibergii, Missouriensis, oligantha, peramoena, pratincola, trichopoda, Feddes' Repertorium, v. 242–244.

Out of a considerable number of new species here characterized, only the first is at all closely akin to true *Arabis*, the best representative of which in the farther West is *A. Blepharophylla* of the coast of California. That and its allies are marked by a truly green herbage which is of thin texture, with no other than a sparse and bristly pubescence. The petals of these, though purple in color, have a broad spreading limb, and the pods are always straight and erect.

Arabis aculeolata. More or less tufted montane perennial, with subscapiform slender few-flowered stems 6 to 10

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inches high and floriferous almost subumbellately at summit only: lowest leaves in a small rosulate tuft, less than an inch long, obovate to oblanceolate, entire or with a coarse tooth or two, the upper face sparsely, the margins more closely, beset with white straight hispid hairs, the bases of the flowering stems similarly invested and quite densely so; cauline leaves few and sparse, oval or oblong, sessile, hispidulous-hairy in a less degree than the basal: raceme few-flowered and the flowers all near the summit; calyx purple, the sepals with a few bristles at tip; petals rich purple, 4 lines long; young siliques erect, rather short, on slender pedicels.

Mountains of southwestern Oregon, and apparently rather local; first collected by Howell, near Waldo, in 1884, and distributed for *A. furcata;* then gathered twenty years later (in 1904) by C. V. Piper in the same general region.

The second species here presented, though the specimens are past flowering, is readily seen to be of that well-marked broad-petalled group of which *A. pulchra* of Jones is typical. All of them belong to the desert regions of the Great Basin.

Arabis nardina. Perennial, younger plants simple, older ones tufted, 4 to 7 inches high, the stem and all foliage very hoary with a minute and dense stellate tomentum; basal leaves forming a tuft, but upright rather than rosulate, oblanceolate, obtuse, entire, ½ to 1 inch long, the cauline oblong-linear, ½ to ¾ inch long, sessile, obscurely auricled: pedicels of the short raceme, and also the calyx stellate-hoary like the foliage: corolla unknown: pods few, straight, erect or ascending on slender pedicels, about 2 inches long, 2 lines wide, abruptly acutish, glabrous, marked with a strong median nerve; seeds in two rows, suborbicular, rather broadly winged all around.

This is known only as collected in the Panamint Mountains, on the Death Valley Expedition by Coville and Funston, 20 May, 1891; their n. 776, and not listed in the Report. The label once bore the name, in Sereno Watson's handwriting, of *Arabis platysperma*, but the specific name was erased, evidently

by Mr. Watson himself, and no other written in place of it. The plant is certainly far removed from the group of *A. platysperma*; and no one familiar with *A. pulchra* and with the diverse aspect of things made congeneric with it, could fail to see that, despite its erect pods, this is of that group.

Though the Californian *A. Breweri* and its allies are greatly at variance with *T. pulchra* in habit, their rather showy and somewhat spreading purple petals indicate for them a place not so far removed. Of this alliance are the three species next following.

Arabis Kennedyi. Subalpine low tufted slender perennial 3 to 5 inches high, notably leafy up to the inflorescence after the manner of *A. Breweri*, but more slender, the herbage delicate, scarcely canescent: leaves of sterile basal shoots 1 inch long, the obovate to oval blades narrowed to slender petioles, both faces stellate, but loosely so; cauline leaves numerous, large, overlapping each other, spatulate-obovate to oblong-ovate and oval, rarely with a tooth or two, sessile, shortly auricled: rachis of the raceme glabrous, as also the pedicels and pods, but calyx as much stellate as the foliage: corolla small, deep purple: pods small and slender, 1 to 1½ inches long, very narrow, obtuse, straight or slightly curved, horizontally extended or slightly deflexed: seeds uniserial, flat, winged.

Mountains of Washoe Co., Nevada, at 8,000 feet, along Galena Creek, P. B. Kennedy, 1 Aug., 1906.

Arabis rostellata. Low and multicipitous after the manner of *A. Breweri*, but the stout lignescent caudex more developed, commonly 2 inches above ground, the flowering stems with their fruiting racemes 3 to 5 inches; basal leaves smaller, mostly ½ to ¾ inch long, spatulate-obovate, regularly and evenly crenate-toothed, stellate superficially, the petiolar part more or less bristly-ciliate; cauline leaves ovate and oblong-ovate or oval, obtuse sessile and clasping: raceme few-flowered; flowers not small, deep purple, the thin sepals purple-

tinged and with a few short substellate hairs; pods 1¼ to 1½ inches long, ascending on ascending pedicels, slightly curved, a line wide as to the main portion, but distinctly narrower toward the base, and at apex rostrate-acuminate: seeds rather few, unisèrial, the mature not seen.

Mt. Grayback, southern Oregon, 15 June, 1904, C. V. Piper; specimens in U. S. Herb., under the collector's n. 6156. A genuine ally of *A. Breweri*, but most distinct as to both foliage and pods.

ARABIS POLYTRICHA. Perennial, a foot high, with one or more upright stems from the tuft of basal leaves, the whole plant pale and glaucous, but most parts also rather roughly pubescent: basal leaves oblanceolate, entire, an inch long, more or less canescent with a pubescence of two kinds, one set of hairs (the principal one) 3-parted to below the middle, others (chiefly marginal) longer, simple and setiform; cauline leaves many, an inch long or more, sessile, almost linear, pubescent on both faces like the lower, shortly auricled; short pedicels of the long pods only bristly-hairy, some of the bristles forked, but not deeply: pods nearly 4 inches long, barely a line wide, strongly falcate-recurved, glabrous, glaucous, closely lineolate, all immature but small seeds in one row.

Hills east of Yreka, in extreme northern California, associated with the somewhat rare *Mirabilis Greenei*, according to the collector, Mr. George D. Butler, who obtained the specimens 8 May, 1909. The flowers are not known, but a calyx or two that have remained as unexpanded buds show sepals well beset with the forked hairs. Habitally this approaches my *A. campyloloba*, but that and *A. Breweri* are in truth nearly related.

A group of low, often matted and many-stemmed species first came into view when Sereno Watson published his *A. Lemmoni*. Besides their low stature and multicipitous habit, they are marked by uncommonly broad leaves, and are whitish, with an unusually dense indument of stellate hairs, this less dense

in certain species which verge toward the *A. platysperma* group. Their flowers are apt to be larger than in other and taller species, and are perhaps always of a deep red-purple, not so very unlike those of the *A. Breweri* group. Their pods are many, and are usually almost horizontally spreading and secund; in this particular most unlike *A. Breweri.*

ARABIS OREOCALLIS. Low subalpine multicipitous perennial, the partly hypogeous branches of the caudex short, stout, covered below the living foliage by the imbricated persistent bases of the leaves of former seasons, the whole plant 4 or 5 inches high and grayish: basal leaves ½ inch long or more, the obovate acute entire blade tapering abruptly to a broad petiole of its own length, both faces minutely and not very densely stellate; cauline leaves uncommonly many and well developed, approximate, large for the plant, spatulate-obovate to oval and narrower, sessile, obscurely auricled, greener than the basal, only sparingly stellate: raceme in flower short and corymbiform; sepals purplish-green and with few or no stellate hairs, always with a narrow purple-scarious margin; petals broad, obtuse, of a rich purple: pods (immature) few, short, narrow.

Collected in the Selkirk and Rocky Mountains, B. C., at 7,000 feet, by C. H. Shaw, July, 1904.

ARABIS BRACTEOLATA. Multicipitous dwarf 3 or 4 inches high, the basal leaves in small rosettes, with distinctions of obovate or oval blade and broad petiole not strongly marked, the leaf as a whole only ¼ to ½ inch long, densely and canescently stellate: flowering stems slender, their leaves sessile and in the form of ovate-sagittate bracts less than ¼ inch long, glabrous, glaucous: flowers unknown: pods only 2 to 4, about 1 inch long, a line wide, obtuse, slightly arcuate and spreading, the valves thin, nerveless: seeds in 1 row, rather thick, short-oval, not winged, though with traces of a narrow scarious margin.

Collected at several stations in northwestern Wyoming, by J. N. Rose, late in August, 1893; the type his n. 399[a].

The rosettes of basal leaves, all so very small, resemble some sedums and saxifrages, while those of the stem recall the cordate bracts of certain streptanthoids.

Arabis semisepulta. Perennial, low, the whole when in fruit only 3 or 4 inches high; subterranean parts consisting of a tap root and hypogeous branches, these each ending in a tuft of leaves ½ to ¾ inch long, firm, whitish with a dense stellate tomentum, the blade ovate, tapering to a long wide petiolar base; cauline leaves sessile, without auricles, these and the stem strongly stellate-pubescent: flowers not known: fruiting racemes short, of 6 to 10 narrow obtuse almost horizontally spreading but curved pods about 1¼ inches long, not tapering to either end: seeds round-oval, wingless and marginless.

Mt. Thielson, Cascade Range, Oregon, near the summit; in loose lava gravel, collected by Coville and Applegate, 6 Aug., 1897; their n. 454 as in U. S. Herb..

Arabis horizontalis. Perennial, the stout and deep tap root supporting at summit a few short subligneous branches, with tufts of leaves and several ascending flowering branches, the whole 6 to 10 inches high: basal leaves of very firm texture, an inch long, oblanceolate, acute, entire, finely stellate and hoary; flowering stems floriferous from near the base, but the cauline leaves not few, closely approximate, ¾ inch long, oblong-oval, sessile, shortly auricled, greener than the basal and only sparsely stellate: flowers small, only 2 lines long; petals purple, twice the length of the oval glabrous purple-margined sepals: pods straight, rather short, ¾ to 1½ inches long, quite broad in the middle portion but tapering gradually to both ends, therefore lance-linear; horizontally spreading on short rigid pedicels: body of seed round-oval, but the seed as a whole orbicular by virtue of the broad encircling wing.

Crater Lake, Klamath Co., Oregon, 1 Aug., 1897, Coville and Applegate; their n. 334 as in U. S. Herb.

ARABIS POLYCLADA. Rather loosely branching caudex subligneous, but not rigid, 3 or 4 inches high, its branches bearing short leafy shoots and among them scapiform flowering stems 3 to 5 inches high; leaves of sterile shoots ¾ inch long, the small obovate obtuse blades shorter than the rather wide petiolar part into which they are rather abruptly narrowed, the whole whitish with a fine and dense stellate tomentum: flowering stem and its few leaves perfectly glabrous and glaucous, the leaves oblong, ½ inch long or less, sessile, not auricled: flowers unknown: pods about an inch long, a line wide, neither obtuse nor acute, straight or very slightly bent, horizontally and secundly spreading on very short pedicels: seeds in one row, suborbicular, winged narrowly, but all around.

Farewell Gap, southern California, C. A. Purpus, 1897; the collector's n. 5229; also well represented in Coville and Funston's n. 1747 of 1891; from the same region, *i. e.*, mountains of Tulare County.

Six species next subjoined are all akin to that group with the smallest of flowers and the broadest of pods and seeds, of which the type is *A. platysperma*.

ARABIS ARMERIFOLIA. Low perennial, multicipitous above a tap root, forming a tuft of short subligneous branches half underground, each crowned with small leaves and, in its season, a slender subscapiform flowering stem or two, the whole 4 to 6 inches high above ground: leaves firm, not glaucous, erect, ½ to ¾ inch long, oblanceolate, obtuse, entire, glabrous throughout; the few cauline linear-oblong, sessile, shortly auricled, spreading away from the stem: flowers not seen: pods 2 to 4 on each scape, erect, straight, about 1¼ inches long, little more than 1 line wide, abruptly acute, valves thinnish for the group: seeds not very definitely biserial, small, suborbicular, encircled by a very broad wing.

On a pumice stone slope in Crater Lake Park, southern Oregon, F. V. Coville, 14 Sept., 1902; type in U. S. Herb.

ARABIS MULTICEPS. Perennial, with deep tap root bearing above ground a much and fastigiately branched caudex, its branches stout, naked below, leafy at summit, the whole caudex 2½ inches high, 3½ inches in breadth: leaves very firm, entire, glaucescent, the oblanceolate blade passing gradually to a stout petiole of its own length, the whole without trace of pubescence of any kind: flower stems scapiform, 4 to 6 inches high, with an oblong sessile bract or two near the base, bearing above the middle 4 to 7 straight linear abruptly acute pods 1½ inches long, 1 line wide: seeds in one row, rather remote, winged.

Mt. Thielson, Cascade Range, Oregon, 6 Aug., 1897, Coville and Applegate; their n. 435 as in U. S. Herb.

ARABIS DENSA. Low and compact, above the single tap root formed into a thick leafy tuft 2 inches high, 3 in breadth, the partly hypogeous and denudate branches thick, scaly with imbricated bases of leaves of former seasons; the crowded and upright leaves oblanceolate, entire, less than 1 inch long, firm, green, glabrous: flowering stems barely 1 inch high: flowers unknown: pods only 1 or 2, erect, straight, 1½ inches long, little more than a line wide, acute, glabrous: seeds in 1 row, orbicular, broadly winged.

On Eagle Cap, at 9,000 feet, in the Imnaha National Forest, Oregon, collected by A. W. Sampson and G. A. Pearson, 14 Sept., 1907. A low and almost pulvinately dense ally of *A. platysperma*, the pods extremely narrow for this group, but gradually pointed as in all this alliance.

ARABIS DIANTHIFOLIA. Perennial, woody at base, the usually solitary stems of the season 4 to 10 inches high: leaves few, the basal and cauline not dissimilar, all small for the plant, and upright, ¾ inch long and less, of rather hard texture, oblong-lanceolate, acute, entire, to the unaided eye glabrous, glaucescent, under a lens seen to be minutely and rather closely ciliolate with short deeply forked hairs, also beset superficially with small sessile pellucid glands: pods closely deflexed, 1¼ to 2 inches long, 2 lines wide, acute, the valves

strongly, even almost carinately, 1-nerved: seeds in two rows, large, thin and flat, broadly winged on one or two margins, sometimes all around.

Crater Lake, National Park, southern Oregon, 14 Sept., 1902, F. V. Coville, n. 1511 as in U. S. Herb. In general appearance at first and superficial glance resembling *A. suffrutescens*, but examination revealing an array of very pronounced characters.

ARABIS ARBUSCULA. Plant a foot high, the slender flowering stems supported by a much branched woody and leafy caudex 4 or 5 inches high: leaves of the basal woody branches ¼ to ¾ inch long, oblanceolate, acute, entire, canescent with sessile stellate hairs, some longer and merely forked ones intermixed, the few cauline oblong-linear, very acute, but at base abruptly widened and auricled, all nearly or quite glabrous: flowers unknown, but pods only 1 to 4 at summit of axis, these nearly 3 inches long, scarcely a line wide, rostrate-acuminate, slightly falcate: seeds in one row, the mature not seen.

Eight Dollar Mountain, in Josephine Co., southern Oregon, C. V. Piper, 13 June, 1904; the collector's n. 5065 as in U. S. Herb. Species most difficult to place, the strongly developed woody caudex pointing to the group of *A. platysperma*, while the foliage is rather that of the *A. retrofracta* alliance, the pods as far from one as from the other.

ARABIS PAUPERCULA. Low subalpine perennial with several more or less buried branches 1 to 2 inches high: leaves of sterile shoots ½ inch long or more, of elliptic-lanceolate acute blade and slender petiole of about equal length, glaucous, sparsely stellate-pubescent: flowering stems scapiform, only 1 or 2 inches high exclusive of the pods, their 1 or 2 leaves sessile but not auricled, obscurely stellate: flowers unknown: pods very few, 1½ to 2 inches long, a line wide, linear, straight, acute, strictly erect, midvein of valves not prominent: seeds in one row, oval, ovally winged, *i. e.*, the wing obsolete at base of the seed, narrow at the sides, very wide at upper end.

Farewell Gap, at 10,600 feet in the mountains of southern California, C. A. Purpus, 1897, his n. 5229½. It has the habit of the *A. platysperma* group, but with rather too much stellate pubescence, and the pods also too narrow.

Formerly every simple-stemmed western *Arabis* wearing the aspect of a rather tall biennial, and having erect small petals and long narrow straight pods, was named *A. Holboellii.* A number of segregates from that medley have long since been offered, and accepted, and others are here indicated.

Arabis nemophila. Apparently biennial, the solitary stem erect, simple, more than a foot high, firm but not stout, unusually leafy up to the very short raceme; herbage green, with barely a glaucescent tinge: basal leaves 1 to 1½ inches long, of oblong-lanceolate entire or remotely toothed limb and rather narrow petiole, all thinly and minutely stellate but not in the least hoary; cauline leaves ¾ to 1¼ inches long, oblong, acute, sagittate-auricled, glabrous: flowers few, small, white; sepals green, with few stellate hairs at summit; petals twice as long, white or pinkish: pods straight, extremely narrow, 3 inches long, perfectly erect above short ascending pedicels: seeds in one row, immature.

Sequoia National Forest, Calif., July, 1908, Dr. Anstruther Davidson; specimens on sheet 612,692, U. S. Herb.

Arabis interposita. Perennial, with stem 1½ to 2 feet high, rigidly erect from amid several suberect leafy offsets; all basal leaves 1 to 1½ inches long, the narrowly ellipsoidal entire blades and narrowly winged petioles of about equal length, both faces substellate-canescent; cauline leaves oblong, sessile, sagittate-auriculate, these and the stem less stellate: flowers not seen: pods narrowly linear, straight, erect, 2 inches long; hardly a line wide; seeds thick, oval, widely winged at the upper end, narrowly so up and down the sides.

A good fruiting specimen on sheet n. 444,616 of U. S. Herb., mounted between two specimens of *A. Drummondii*, all as collected by W. C. Cusick, in 1902, somewhere in south-

ern Oregon or northern California, the exact locality not indicated.

In foliage and pubescence much like my *A. campyloloba*, but as to fruit and seed widely different.

Arabis hastatula. Perennial, a foot high, the several stems slender, decumbent at base around a leafy central axis: axial leaves 1 to 1½ inches long, very narrow, the lanceolate acute blades not as long as the petioles, these dilated at base and there with or without a long simple bristly hair or two, otherwise perfectly glabrous, light-green and glaucous; cauline leaves sessile by a hastately-auricled base, oblong, acute: raceme few-flowered, flowers nodding on short pedicels: calyx dark-purple, of less than half the length of the purple petals: pods (immature) filiform, straight, abruptly deflexed.

Collected at an altitude of 6,000 feet in mountains of the Imnaha National Forest, Oregon, 25 June, 1907, by A. W. Sampson and Gustaf A. Pearson. Evidently allied to *A. retrofracta*, but glabrous, or with none but simple hairs and these only marginal.

Arabis subserrata. Stoutish, biennial or perennial a foot high or more, usually without branches: earliest leaves not seen, the lower cauline closely approximate, oblanceolate, short-petiolate, acute, often saliently serrate-toothed, 1½ inches long, of a pale glaucous green, also thinly and minutely stellate, those at midway of the stem and upward oblong, acute, sessile by a sagittate base, 1 inch long, sparsely stellate beneath, glabrous and glaucous above; stem, also rachis of raceme, glabrous, but pedicels and calyx with many mostly ternate short hairs; corolla nearly ½ inch long, rich purple: pods 3½ inches long, a line wide, glabrous, glaucous, usually slightly curved, spreading: seeds in one row, suborbicular, narrowly winged all around.

Western Washington, at Ellensburg and elsewhere in the same general region, collected in April and May, 1899, by Kirk Whited.

ARABIS POLYANTHA. Stout upright perennial a foot high or more, the leaves and stem hoary with a short and dense substellate tomentum; basal leaves oblanceolate, more or less dentate, 1 to 1½ inches long; cauline leaves rather crowded, all linear or lance-linear, revolute, sessile by an auricled base, appearing (by virtue of strongly revolute margin upwards) as if acuminate: flowers very numerous, forming an uncommonly thick and dense raceme, the rachis only sparsely stellate, but pedicels tomentulose, as are also the pale-green sepals and even the forming pods; petals nearly an inch long, apparently white, or only pinkish.

A. Rock Island, eastern Washington, 27 April, 1879, Kirk Whited; his n. 1043 as in U. S. Herb.

The specimens are scarcely past full flowering; the pedicels are deflexed, and so doubtless are the pods, and these probably straight and narrow.

ARABIS SETIGERA. Biennial or perennial, the stems mostly solitary, rigidly erect, a foot high, glabrous; rosulate basal leaves ¾ inch long, elliptic-lanceolate, scarcely petiolate, glaucous, superficially glabrous but the whole margin closely bristly-ciliolate, the bristles of the basal part of the leaf apt to be simple, the others usually forked but not deeply so; cauline leaves few, short, appressed to the stem, sessile, scarcely auricled, ciliolate like the basal: flowers not seen: fruiting stems racemose from below the middle; pods straight, closely reflexed on very short pedicels, 2 inches long, more than a line wide, acutish: seeds uniserial, narrowly winged at the sides, broadly so at the summit.

Corral Springs, Klamath Co., eastern Oregon, collected by J. B. Leiberg 2 Aug., 1894; his n. 610 as to label in U. S. Herb., on sheet 404,822.

ARABIS DACOTICA. Biennial, perhaps more enduring, a foot high and simple, from a single tuft of elliptic-lanceolate rather slenderly petioled basal leaves, these an inch long or more, of a pale bluish green, scarcely hoary, yet clothed on both faces

with subsessile trifid hairs, but the hairs of the petiole, and of lower part of stem long, simple, and setaceous, those of the stem deflexed: cauline leaves, oblong, abruptly acute, auricled at base, the lower of them with some simple hairs, the upper glabrous: rachis of the raceme and also the pedicels glabrous: sepals green, beset with a few short hairs; petals pale purple, surpassing the sepals by less than half their length: pods 3 inches long, a line wide, obtusish, nearly straight, on slightly deflexed pedicels; the valves traversed by a distinct median nerve: seeds in 2 rows, longer than broad but of singularly varying outline, also often winged on but one side, as often on two, the wings always rather narrow.

Fort Meade, South Dakota, 28 May, 1887, W. H. Forwood, the specimens on U. S. Herb. sheet 317,556.

The few species concluding this paper seem in no cases referable to any one of the groups above recognized.

Arabis pendulina. Biennial or perennial, a foot high, with several suberect stems from around a tuft of basal leaves, these an inch long, oblanceolate, the blade glabrous superficially, the margins of it ciliate with short forked hairs, the broad petiole as much ciliate, but with stouter and simple setaceous hairs, those next the base of the stem quite strongly hirsute throughout; cauline leaves many, short, ovate or ovate-oblong, sessile, auriculate, erect, glabrous or the auricles above bristly-hairy: flowers small, purple: fruiting raceme long and loose; pods ¾ to 1¼ inches long, obtuse, slightly curved, pendulous on the long rather slender pedicels: seeds distinctly biserial, oval, wingless, marginless.

In woods of the Charleston Mountains, southern Nevada, at 7,000 to 8,000 feet, C. A. Purpus, 1898; his n. 6104 as in U. S. Herb.

Arabis setulosa. Perennial, the somewhat arcuately ascending and rather slender stems less than a foot high from among a few tufts of rosulate basal leaves, these ¾ inch long,

spatulate-oblanceolate, entire, loosely bristly-ciliate all around the margin, the bristles simple, upper face of leaves glabrate in age but when young setulose-hairy; cauline leaves oblong, sessile, obscurely auricled or not at all so: flowers not known: racemes in fruit rather short; pods somewhat arcuately recurved, but on horizontally spreading pedicels of nearly ½ inch, their own length 1½ inches, their width rather more than a line, obtuse at apex, at base gradually narrowed; seeds in 1 row at the narrow base, thence upward distinctly biserial, all wholly wingless and the margin obtuse.

At 6,000 feet in the mountains of Utah near Marysvale, M. E. Jones, 31 May, 1894. A graceful species in fruit; the pubescence strange for this group of species with pendulous pods.

Arabis acutina. Stems several, slender, rigidly erect, less than a foot high from a short hard woody caudex of few branches and with a few small leaves, these elliptic-lanceolate, less than 1 inch long, acute, pale and glaucescent, also roughish with a sparse stellate pubescence, the bases of the flowering stems similarly roughened; cauline leaves oblong, ½ inch long or more, sessile, auricled, mostly quite glabrous: flowers small, pale-purple, the sepals thin, glabrous: pods about 2 inches long and a line wide, straight, ascending on rather long pedicels, very acute, the valves smooth without so much as a manifest midnerve: seeds in 1 row, round-oval, narrowly winged.

Mt. Thielson of the Cascade Range, Oregon, Coville and Applegate, 6 Aug., 1897; their n. 434 as in U. S. Herb; apparently the same also from the Three Sisters, Oregon, by M. W. Gorman, 19 July, 1903; his n. 1692.

Arabis tenuicula. Perennial, the much branched subligneous caudex only 1 to 2 inches high, this also slender like all other parts of the plant, the almost filiform upright flowering stems only 3 to 5 inches high: leaves of basal shoots from ¼ inch long in the earliest to ¾ inch in the later, in outline

from obovate and petiolate to oblanceolate, all acutish, some quite sharply few-toothed, others entire, all very glaucous, stellate-hairy superficially, and with some long bristly but forked hairs on the basal and petiolar parts; cauline leaves ½ inch long or more, linear, sessile, strongly auricled, either obscurely or quite saliently 3-toothed at apex, glabrous, glaucous: raceme very few-flowered; flowers small, light-purple: pods 1½ to 1¾ inches long, little more than ½ line wide, slightly acuminate, straight, erect or ascending on filiform pedicels ½ inch long: seeds uniserial, very small, oval, winged only across the summit.

Collected somewhere in either eastern or southern Oregon "in clefts of rocks," in May, 1883, by W. C. Cusick. The label in U. S. Herb. bears the collector's n. 1124. A cespitose species, with all the parts remarkably slender and delicate.

New Papilionaceae.

BAPTISIA OXYPHYLLA. Main stem not known, but branches glabrous, wiry, beset closely with sessile trifoliolate leaves subtended by spreading conspicuous and persistent stipules: leaflets 1½ inches long, rhomboid, cuneately tapering from below the middle, very acute at apex and ending in an almost spinescent sharp mucro, glabrous and finely reticulate on both faces, but the margins obscurely pilose; stipules more than ½ inch long, spinescently acuminate above an ovate-lanceolate body: raceme probably solitary, large as that of *B. leucophaea*, conspicuously bracted, the bracts lance-ovate: calyx-segments exceeding the tube, triangular-subulate, very acute, pilose-ciliate: immature pod oval, long-pointed, pubescent.

Remarkable ally of *B. leucophaea*, found on Pearl River, southeastern Louisiana, in October, 1901, by Mr. Reginald S. Cocks. The rhombic leaflets and large stipules are so rigid, and end so sharply, as to make the plant appear almost spines-

cent; also the stipules spread away almost divaricately from the stem, instead of being erect and appressed to the stem as in other stipulate species.

BAPTISIA SALIGNA. Allied to *B. leucophaea*, larger, not blackening in drying; only the stems with some rather scanty spreading soft pubescence; leaves glabrous except as to a sparse strigose pubescence along the midvein beneath; leaflets oblanceolate, obtuse or emarginate, 2½ to 3½ inches long, of a deep glaucescent green and glabrous above, beneath distinctly glaucous: flowers in a solitary raceme, much smaller than those of *B. leucophaea*; calyx campanulate, deeply 5-toothed, the teeth acutish, notably woolly-margined: pods not known.

Known only as collected near Tallapoosa, Georgia, in April or May, 1900, by Mr. P. M. Way, the type in U. S. Herb., sheet 370,935. Well marked by its long large leaflets, recalling the leaves of certain blue-green-leaved willows; the whole plant so far from being invested by the conspicuous pubescence of *B. leucophaea* as to appear glabrous as to all but its only rather obscurely villous stem.

BAPTISIA NUCULIFERA. Plant evidently much branched, closely leafy, with solitary large flowers in the axils of upper leaves; stem and midvein of leaflets beset with appressed long hairs, but herbage appearing glabrous, and in drying blackened; stipules apparently wanting, certainly fugacious if ever present: leaflets cuneate-obovate, very obtuse, commonly emarginate, 2½ inches long in large plants, in smaller half as large, dark above, glaucous beneath, finely reticulate especially beneath: fruiting pedicels stout, ½ inch long, calyx in fruit ¼ inch long, cleft below the middle, the segments subulate, very acute: pod ligneous, orbicular, so little compressed as to be nearly globose, little more than ½ inch long and broad, ferruginous-silky, its stipe about equalling the calyx.

Specimen in fruit only, collected at Ruston, Louisiana, July, 1899, by Reginald S. Cocks, the label indicating that it was

at first taken for *B. tinctoria*, of which it has somewhat the mode of flowering; though there is nothing else by which to connect it with that species. Its aspect is more that of a broad-leaved and axillary-flowered *B. lanceolata*.

LUPINUS CLEMENTINUS. Perennial(?), 2 feet high, with stems or basal branches decumbent, leafy throughout with small leaves and everywhere rather shortly and roughly hirsute with coarse hairs: leaflets about ¾ inch long, cuneate-oblong, very obtuse, thin, alike green on both faces: racemes short, subsessile, the flowers large, scattered: corolla $\frac{3}{5}$ inch long and as broad, deep purple; keel petal narrowly falciform, naked: half grown pods very densely hirsute-tomentose.

Island of San Clemente, California, June, 1903, collected by Mrs. Trask, who records it as occurring on only one particular part of the island. The plant is not known to a certainty as being a perennial, but there are marks on the specimen which seem to indicate it as being other than annual.

LUPINUS HYACINTHINUS. Tall perennial, the several stems upright or nearly so, leafy to the summit, there ending in a sessile short raceme of large purple flowers, these but indistinctly verticillate; herbage rather dull-green by a short stiffish but appressed pubescence, this longer and denser on the upper face of leaves: petioles short, about equalling the leaflets, these about 7, oblong-linear, very acute, nearly 2 inches long: pubescence of rachis, pedicels and calyx denser and less appressed, rather villous-hirtellous: lips of calyx subequal, both entire: corolla $\frac{3}{5}$ inch long, the banner shortest of the petals, keel longest, somewhat strongly falcate, naked.

San Jacinto Mountains, southern California, 22 July, 1897, H. M. Hall, distributed as his n. 712.

Miscellaneous Specific Types.—II.

GARRYA MOLLIS. Branches of the fourth and third seasons back dark-green or purplish and obscurely puberulent; all the younger quite hoary with a thin tomentum: earliest leaves of newest twigs round-obovate, very obtuse or even emarginate, 1 inch long, the later and more usual 2 inches long, exactly elliptical, acute at both ends, all quite plane, very pale with bloom, and further whitened on both faces by a thin but dense silky tomentum: bracts of young undeveloped aments triangular-ovate, cuspidately acute, equally white-tomentulose with the foliage: fruit unknown.

Collected by Mr. G. A. Pearson, at an altitude of 5000 feet in the San Francisco Mountains of northern Arizona, 8 August, 1909. The whiteness of this shrub, a characteristic which is due to a heavy bloom, intensified by an almost white soft-silkiness, will place it in marked contrast to all other known members of its genus.

CREPIS ACULEOLATA. Acaulescent, 2 feet high, with thin glabrous foliage, the scapiform flowering stem glabrous to above the middle: leaves 8 inches long, the broad blade and slender petiole of about equal length, blade oblong-oval, obtuse, lightly runcinate-dentate, the base ending very abruptly and subhastately: heads rather few and large in a corymbose terminal cyme, the branches of this, also the stem from some distance below it, the pedicels of the heads and the bracts of the involucre armed with dark-colored stout straight prickle-like hairs each with a small gland at summit; heads ½ inch high, bracts 20 or more, linear, acuminate; flowers numerous.

Collected somewhere in Utah, presumably southward, in 1875, by Lester F. Ward; his n. 606 as in U. S. Herb.

CREPIS PALLENS. Acaulescent, 1½ feet high, glabrous, pale green, glaucescent: leaves of the thinnest texture, 6 to 8 inches long, of a somewhat elongated obovate outline, rather

abruptly tapering below to the short petiole, at apex very obtuse, the margins either almost entire or with a few remote but salient straight teeth: branches of cymose panicle sparsely and shortly hispid with dark hairs: heads 20 or more, about ⅓ inch high; bracts of involucre oblong-linear, obtusish, glandular and pubescent on the back, at summit ending in a simple or else deeply forked (and appearing double) stout bristly hair.

Wet meadows in eastern Oregon, W. C. Cusick, 1884.

CREPIS OBTUSISSIMA. Acaulescent, 1½ feet high, with thin deep-green foliage very ample, glabrous above, beneath sparsely somewhat pappilose-scabrous; leaves 4 to 8 inches long, with blades broadly oval to broadly oblanceolate, very obtuse, narrowed abruptly to short broad petioles, the sides conspicuously and coarsely runcinate-toothed: heads smallish, 15 to 20 in a strongly corymbose panicle; involucres nearly cylindric, ⅓ inch high, their some 20 bracts broadly linear, scarcely acute, sparsely viscid-villous with short appressed white hairs.

Ellensburg, Washington, 20 June, 1897, Kirk Whited; his n. 420 as in U. S. Herb.

LITHOPHRAGMA ANEMONOIDES. Stems stout for the genus and not tall, 5 to 10 inches high arising from a cluster of fibrous roots and many granular bulblets or tubers an inch below the surface of the ground; both basal leaves and the one or two cauline remarkably ample, quinately divided and with broad rounded abruptly acutish segments: pubescence of leaves, both superficial and marginal, short, subsetaceous, the longer hairs somewhat flattened, the shorter gland-tipped, that of the stem minute, spreading, glandular-setulose: raceme very short, of few large flowers: calyx densely setose, its tube turbinate, cohering with the ovary, segments ovate-trigonous, acute; petals large, flabelliform, deeply trifid, pinkish.

On dry hills under bushes at Klamath Falls, southern Oregon, 28 April, 1907, E. I. Applegate. Allied to *L. parvi-*

flora, but plant of remarkably stout habit and ample foliage, a single large cauline leaf under the short raceme; the whole recalling some anemone.

COLLOMIA SCABRA. Annual or biennial, stout, much branched, the branches with short broad leaves and terminal strongly involucrate clusters of sessile flowers, the whole herbage coarsely scabrous and glandular: proper leaves oblong-oval, 1 to 1½ inches long, acute or acutish, those forming the involucre ovate or oval, ½ to ¾ inch long and at base nearly as wide, obtuse: green-herbaceous lobes of the calyx triangular-ovate, obtuse, much shorter than the scarious tube, the whole calyx stiffly short-hirsute and glandular-viscid: corolla white, or whitish, ¾ inch long, slenderly funnelform above a filiform base.

Stony beds of dry gulches in the Rattlesnake Mountains of southeastern Washington, collected by J. S. Cotton, 16 July, 1902. Perhaps next of kin to *C. grandiflora*, remarkable for its short and almost blunt leaves and bracts, and for the roughness of the whole herbage.

PERSICARIA CYGNEA. Of the amphibious group, with upright stout closely leafy stems, either terrestrial, or if aquatic with no tendency to float: leaves broadly lanceolate, 5 to 8 inches long including the short stout rigid petioles, of a rather light green and a firm texture, both faces closely strigose with short stout closely appressed hairs, those of the midvein only stouter than the others: peduncle of the solitary spike glandular-hispid with stout red setae that are gland-tipped; spike cylindric, 2 to 3½ inches long, the flowers of a deep almost blood-red; bractlets glandular-scabrous and with very few short almost subulate marginal appendages instead of hairs or bristles.

Collected in Klamath Co., Oregon, 14 May, 1895, by E. I. Applegate, with no remark about habitat except the name of Swan Lake; so that as to whether it inhabits meadows, or shores, or has the bases of its stout upright stems in water, we have no knowledge.

Studies of Thalictraceae.—II.

Soon after having determined that the tall white-stemmed meadow-rue of the Potomac Valley was really nameless, I had fixed upon the name *T. praealtum* for it, in my mind; yet, when coming later to the actual writing of its description, I seem to have allowed another word of the same import to usurp its place in the manuscript, and in the proof-reading it was as inadvertently allowed to stand. I now therefore write THALICTRUM PRAEALTUM, to take the place of the synonymous *T. altissimum* of page 58 preceding.

The present paper, it will be seen, has to do with small montane species of a very marked and peculiar group.

THALICTRUM CHEILANTHOIDES. Plants tufted, the scapes slender, 3 to 5 inches high, often with a leaf of 1 to 3 leaflets in the middle; basal leaves ½ to 1 inch long on slender petioles of equal length; leaflets 9 to 11, of a vivid green above, glaucous beneath, in outline from subreniform to cuneate-obovate, rather deeply broadly and obtusely lobed, the lobes alone with abruptly elevated veins as to the green upper face, the whole of the glaucous lower face traversed by veins much less elevated: pedicels of the flowers almost filiform, long and ascending, though with a slight downward curvature: sepals oblong, obtuse, greenish: filaments linear-oblong, prominently and rather sharply mucronate, the mucro more or less distinctly curved and hook-like: fruit not seen.

Summit of Bald Peak not far from Santa Fe, New Mexico, at 12,000 feet, collected by Paul C. Standley, 11 July, 1908; his n. 4324 as in various herbaria. Distinct from all other western montane allies of *T. alpinum* by the green coloring of the upper face of its foliage, in which respect it evinces an affinity for real British *T. alpinum*; but it has not the shining green that is so characteristic of genuine *T. alpinum*, as well as of some of its American varieties or subspecies of our

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northeastern seaboard, such as were indicated by me in the *Ottawa Naturalist* (1909), vol. xxiii, pp. 17–19.

THALICTRUM LEIOPHYLLUM. Plants very large, the scapes 6 to 9 inches high, the leaves erect, some of them 4 inches high including the long firm petiole; leaflets 9 to 17, glaucous on both faces, hardly less so above than beneath, also both faces devoid of notable venation and very smooth, of remarkably thin texture, even those remaining over from the preceding season hardly more than firm-membranaceous, nearly all broader than long and all lightly but evenly and distinctly crenate-lobed; pedicels almost filiform yet rather wiry, wholly curved and gradually so bearing the fruits at a distance from the rachis, or occasionally almost pendulous: mature carpels 1 to 4, short and thickish, not strongly oblique at summit, also rather lightly ribbed.

Denizen of open bogs at much lower than alpine stations in southern Wyoming. The specimens before me are, first of all, such as were collected by Elias Nelson, in Chimney Park, 1 Aug., 1901. These, which I name as typical, are from the herbarium of the University of Wyoming as a loan. All these are in nearly or quite mature fruit. The characters of the almost white-glaucous leaves of such very thin texture and with only a delicate and inconspicuous venation suffice to mark this as specifically distinct from other Rocky Mountain plants of its kindred which have whitish yet quite coriaceous and roughly veiny leaflets, all of which are also of cold dry alpine heights. At substantial agreement with these Nelsonian specimens are two sheets in the same herbarium gathered by Mr. Geo. E. Osterhout, in Big Creek Park, Wyoming, one in July, 1896, the other in the same month of 1898.

Out of the 12 good specimens thus at hand, 11 are wholly pistillate. The other has a few stamens accompanying the pistils; and these show an excellent character in the anthers, for these are uncommonly long and linear, as well as very blunt and pointless at apex.

The species the descriptions of which are next subjoined

belong to alpine summits of various and widely separated arid regions from Colorado to California. They all differ from *T. alpinum* of Wales, Scotland and eastern Canada in having a more coriaceous foliage that in none is green above, but is almost white-glaucous on both faces. The marks by which they differ among themselves might in several instances be considered varietal rather than specific were they all from the mountains of Colorado, or all from those of Utah and Nevada, or all from those of middle and southern California. But, knowing as I do how extremely different the climatic conditions are between either the Rocky Mountains of Colorado, or those of Utah and the White Mountains of southern California, and by how many hundreds of miles they are sundered from each other in space—how completely isolated each type is, and for ages has been—I reasonably hold these forms to be of higher rank than those occurring within the small and climatically uniform district of the islands and peninsulas of eastern Canada, where I have found real *T. alpinum* to exist in four distinguishable varieties.[1]

THALICTRUM SCOPULORUM. Plants not tufted, often solitary, usually 3 to 7 inches high, the scapes wiry, floriferous from below the middle, the leaves short-petioled and spreading, or at most ascending: leaflets very small, usually 11 to the leaf, coriaceous, both faces glaucous, yet the upper somewhat lustrous, also marked with white veins that are continuous from base to and through the lobes, these very obtuse, also the sinuses mostly closed, the lobes meeting or even overlapping each other: pedicels slender, not greatly elongated even in fruit, curved downwards throughout their length: sepals ovate-oblong, acute: anthers almost linear, long-pointed, or at least acute: carpels few, oblong-obovate, rather strongly ribbed, sessile.

Common on rocky and bleak alpine summits of the mountains of Colorado, a good type being Hall and Harbour's n.

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[1] Cf. *Ottawa Naturalist*, xxiii, 17–19.

10, as in U. S. Herb., where also are better specimens by John Wolf, from 10,000 feet in South Park, 1873. Specimens from the same State, from various more recent collectors, are before me, to the number of about 30 plants, all at agreement with the above description, and wrongly labelled *T. alpinum*. These many sheets show a vast preponderancy of staminate plants, and many that are hermaphrodite, only an insignificant proportion of them being purely pistillate.

THALICTRUM SUSPENSUM. Larger plants 9 inches high or somewhat more, the leaves alone often 4 inches, and even 6 in height, the length chiefly that of a very slender and wiry purple petiole, this either ascending or suberect, the leaf proper only 1 or 2 inches long, of about 9 to 11 leaflets, the rachis and petiolules almost filiform; leaflets pale, glaucescent and dull above, glaucous beneath, cuneate-obovate to flabelliform, broadly and rather deeply 3- to 5-lobed, but lobes commonly abruptly acutish, veins rather prominent on both faces: fruiting raceme often 4 or 5 inches long, the fruiting pedicels ½ to ¾ inch long, filiform and seeming pendulous in large plants: achenes commonly 3, quite as often 2 only, sessile, subclavate except as curving outwards, distinctly and very closely and evenly striate.

High summits above Durango, in southern Colorado, by Baker, Earle and Tracy, 24 July, 1898; their n. 437 as in my herbarium. Plant as large as *T. leiophyllum*, but the foliage coriaceous and veiny. The greatly elongated pedicels are not slender, but rather firm and stiff despite their superficial aspect of being pendulous. It is in deference to this character, supplemented by those of the long-petioled and upright leaves, and the narrow flabelliform leaflets, that I feel constrained to place the plant as specifically separate from *T. scopulorum*.

THALICTRUM DURIUSCULUM. Plants 4 to 7 inches high, the foliage short and compact, the stems stout, rigidly erect, striate-angled, in no degree purple tinted: largest leaves 1½

long, short-petioled leaflets rather constantly 11, not very glaucescent above and somewhat shining as well as conspicuously though very delicately venulose, the lower face very glaucous and more coarsely veiny, the lobes shallow and very obtuse: pedicels often ½ inch long, abruptly recurved, the longer seeming pendulous, the fruit often of a single achene, less commonly of 2 or 3, narrowly obovoid above a short thick stipe, the body but little inequilateral and style not much curved, the ribs few and coarse, intervening striae rarely manifest.

A very hard and rigid small species, represented by numerous specimens on sheets 303,811 and 303,812, U. S. Herb. Collected by M. E. Jones, near Fish Lake, Utah, in August, 1894.

THALICTRUM ELEGANTULUM. About 6 inches high, the leaves 2 to 2½ inches long, their petioles short but slender, these and the equally slender stem without purple tint and pale green; leaflets usually 21, glaucescent and dull as well as prominently venulose on the upper face, very glaucous beneath and also there prominently veiny, the lobes abruptly acutish: stem with a solitary and simply ternate leaf below the middle; pedicels about ¼ inch long, filiform, recurved, not pendulous: achenes most commonly 3, rarely 2 or 4, very shortly and stoutly yet not indefinitely stipitate, of subfalcate-oval figure with short uncinate style, also somewhat stoutly ribbed and with some intervening shorter striae.

Clover Mountains, Nevada, S. Watson, Sept., 1868; his n. 5 as in U. S. Herb.

THALICTRUM MONOENSE. Plants slender, 3 to 5 inches high; foliage short and compact; leaflets only 11, mostly as broad as long, obtusely about 3-lobed, dull glaucescent green above and there mostly veinless except as to the lobes, these marked by 1 to 3 slender but sharply prominent whitish veins, the lower face very glaucous and venulose: flowering pedicels short, slender, pendulous: sepals oblong-lanceolate,

acutish, thin, slightly purple-tinted: stamens about 6; ovaries 3 or 4, stipitate: fruit not seen.

White Mountains, Mono County, California, 12 July, 1891, Coville & Funston, No. 1806; type specimen on National Herbarium sheet No. 294. Doubtless related to *T. duriusculum* of Utah, but upper face of foliage differing as to hue and venation, also dull-green, whereas that of the Utah species is distinctly lustrous as in *T. alpinum*.

A Fascicle of Violets.

VIOLA REPTABUNDA. Acaulescent and related to *V. primulifolia*, but small and low, fully developed late summer specimens 3 or 4 inches high, blades of largest leaves 1½ to 2 inches long, subcordate-deltoid, acute, obsoletely crenate, glabrous on both faces, in texture rather firm: pods from late apetalous flowers oval, obtuse, strongly nodding on their short but otherwise upright peduncles: such low autumnal plants surrounded by many runners a foot long, rooting and forming new plants at frequent intervals, these also fruiting in autumn.

Sandy swamp near Moultrie, Georgia, R. M. Harper, 25 Sept., 1902; his n. 1675 as in U. S. Herb. The petaliferous flowering of such a type is not needful to establish it is distinct from and all varieties of *V. primulifolia*.

VIOLA SENECIONIS. Akin to *V. primulifolia*, much taller, at petaliferous flowering 6 or 7 inches high, in summer development not very much larger: blades of largest leaves nearly 3 inches long and 2 in breadth, of subcordate-oval outline, rounded and very obtuse at summit, only slightly and very abruptly tapering at base to the long petiole, the whole margin coarsely and very evenly crenate: petaliferous flowers small for the plant, white, their peduncles often 6 or 7 inches high, their bractlets linear-filiform, inserted at about the middle;

apetalous aestival and autumnal flower on upright petioles almost as long.

Southeastern Maryland, on the Nanticoke River, near Vienna, 23 Aug., 1906, collected by Forrest Shreve and W. R. Jones; their n. 1340 as in U. S. Herb. There is another sheet of the same from further northward, and not far from Baltimore, by C. O. Thurston, 19 May, 1889. It is from these specimens that the character of the early flowers is drawn. The species is named in reference to the form of its very broad and rounded leaves, recalling as they do those of genuine *Senecio aureus* as we have it in the damp woods of Maryland and Virginia.

VIOLA LUNELLII. Acaulescent, low, with small foliage and few large blue-purple flowers, all parts glabrous: most typical leaves, at time of petaliferous flowering exactly cordate-ovate, acute, less than an inch long, not cucullate, the very earliest and smallest usually reniform and obtuse, others intermediate between those and the typical and acutely cordiform: peduncles stoutish, surpassing the leaves, their small green bractlets triangular-subulate, inserted much above the middle: sepals short for the corolla, oval-oblong, very obtuse, even almost retuse now and then; corolla ¾ inch long, of almost the same breadth, petals subequal, the upper pair with oval limb, these and the laterals obtuse, the odd petal rather broader and so deeply emarginate as to be almost obcordate.

An inhabitant of wet meadows or swamps near Leeds, North Dakota, 31 May, 1910. At first glance recalling my *V. cognata* of wet meadows in Wyoming and Montana, being of about the size of that species; but the type of leaf outline is so different, that the best specimens recall so very dissimilar a plant as *V. Selkirkii*, to which *V. Lunellii* is nevertheless in no degree related. Dr. Lunell himself pointed out to me the fact of his inability to reconcile the plant with my description of *V. cognata* because of the entirely dissimilar calyx, which my Dakota correspondent finds in his plant, made up of sepals

that are not only very abruptly obtuse, but have a gland at the end, or sometimes a notch, and two glands.

VIOLA DASYNEURA. Caulescent yellow violet akin to *V. glabella.* Stems 8 to 10 inches high, slender for this group, glabrous throughout, or with a line of hirtellous hairs at summit under the flowers; even the petioles with but a line of hairs up and down the furrowed inner side: leaves small for the group, and thin, deep-green above, the veins there scaberulous, lower face paler, hirtellous-hairy either on the veins only or also between them; stipules obliquely oblong and lance-oblong, obscurely serrate-toothed: peduncles 2 or 3, subterminal, filiform and much elongated, bearing the rather small yellow flowers quite above all the foliage; sepals lanceolate, acuminate, ciliolate; ovaries glabrous.

Sandy soil about Standish Pond, near Tecumseh, Michigan, 5 May, 1899, Lyster H. Dewey; two sheets in U. S. Herb.

VIOLA HURONENSIS. Tufted stems of the season upright, 3 inches high at petaliferous flowering, arising from the branches of a short caudex crowning the tap root; all the herbage excepting the lower face of the mature leaves, rather densely hirtellous-puberulent, this indument more conspicuous on stem and stalklets, also obviously retrorse: stipules linear as to the body, but with 3 or 4 subulate spreading lobes: leaves many, small, the blades seldom more than ½ inch long, broadly subcordate-ovate, obtusish, some nearly truncate at base, all abruptly joined to the long slender petiole, at apex obtuse, or at least not acute: flowers borne scarcely above the leaves, on slender peduncles bibracteolate not far below the calyx, the bractlets linear, intensely green-herbaceous, entire; sepals long, lance linear, acute; corolla blue, ¾ inch long, but narrow, the spread of the subequal petals not great; spur very long, straight except at the obliquely acute and somewhat falcate end.

Near Port Franks, Ontario, on summits of high sand hills

skirting the shore of Lake Huron; collected by Charles K. Dodge, 12 May, 1906.

VIOLA UNCINULATA. Caulescent and of the *V. adunca* alliance, but stem undeveloped and not obvious, the whole plant above ground scarcely 2 inches high, in every part glabrous: leaves from suborbicular to broadly ovate, ¼ to ¾ inch long, often as broad, seeming entire, in reality very remotely and obscurely crenate: peduncles 1½ to 2 inches long, bearing the flowers much above the leaves, bibracteolate above the middle, the bractlets delicate, subulate: corolla nearly ¾ inch long including the very long nearly horizontal and almost cylindric spur which beyond the obtuse end is abruptly narrowed and prolonged into a slender and hook-like appendage a half-line long; limb of petals rather broad, very obtuse; sepals oblong-linear, rather obtuse.

Collected near Crater Lake, Klamath Co., Oregon, 17 Aug., 1896, by E. I. Applegate, the fine specimens on sheet 855,292 U. S. Herb. *V. retroscabra* of southern Colorado has a somewhat similarly appendaged spur, and so has *V. mamillata* of Utah (p. 32 preceding).

VIOLA ANISOPETALA. Dwarf and compact, only 1½ to 3 inches high at petaliferous flowering, but flowers large in proportion and borne an inch above the tuft of leaves, the plant thus seeming like an acaulescent violet, the whole plant almost, or in some altogether, glabrous: leaves rather firm, from reniform-cordate in the earliest to cordate and oval in the later, all very obtuse, minutely crenate, the blades ½ to ¾ inch long, tapering abruptly to the short and not slender petiole; stipules remotely and subpinnately lacerate: peduncles not slender, notably bibracteolate much above the middle, the bractlets linear, acute erect: sepals lance-linear, acutish, nerveless: corolla ¾ inch long, not as broad, light violet or blue, the odd petal out of all proportion longer than the others, broad and emarginate, or even obcordate, the others perfectly rounded at the apex; spur short though well pro-

jecting almost horizontally, subcylindric, straight, obtuse. Apetalous summer state with slender very leafy stems 3 to 4 inches high: leaves about 1½ inches long, cordate-ovate, abruptly somewhat pointed at summit, yet the very apex almost obtuse, the margin lightly and rather minutely but closely serrate rather than dentate, of a dull deep green, but the venation conspicuous as being paler, all angles of stem and petioles, as well as margins of foliage and stipules, delicately scabro-puberulent: sepals lance-linear, acute, glabrous.

Meadows in the vicinity of Leeds, North Dakota, the specimens both early and late, communicated by Dr. J. Lunell, in 1909.

VIOLA CENTELLIFOLIA. Low and delicate, caulescent, but leafy stem nearly obsolete, the leaves rather many and with long petioles, but flower apparently one only to each stem; herbage light-green, the leaves membranaceous as in members of the *V. blanda* group, their outline round-oval to oval, very obtuse, truncate or subcordate at base, lightly crenate, delicately hirtellous-roughened marginally and along the veins on both faces, the petioles scaberulous along the angles: peduncle surpassing the leaves, bracteolate above the middle, the bractlets subulate; sepals oblong-lanceolate and lanceolate, very acute; corolla ½ inch long or more, apparently white, spur shorter than the limb of its petal, straight, obtuse.

Collected somewhere in the Blue Mountains, Oregon, 29 June, 1899, by Mr. C. L. Shear. Without its flowers this pale thin-leaved violet would pass readily for acaulescent and a member of the *V. blanda* group; but the flowers being indubitably those of the *V. canina* alliance, a careful inspection brings to light the short proper stem, and also the stipules of the caulescent species. The cut of its seemingly radical leaves is so nearly that of *Hydrocotyle* and its allies as to have suggested the name I assign it.

New Species of Sambucus.

Sambucus orbiculata. Twigs of the season minutely puberulent, all the older parts of the branches glabrous: leaflets 5, or those of earliest foliage 3 only, all except those of leaves next under the corymb suborbicular, 1 inch long or more and of nearly or quite the same width, of rather firm texture, beneath scabrous-pubescent, but between the veins rather than along them, the margins not deeply but closely cut, in those of the most rounded leaflets dentate, in those of the later and more oval ones serrate, all cuspidate-acute at apex and very abruptly inequilateral at base.

Santa Lucia Mountains, Calif., May, 1898, R. A. Plaskett; his n. 141 as in U. S. Herb. The specimens were barely in flower at time of collecting. The species is of the group of *S. caerulea*, Raf.

Sambucus coriacea. Growing branches of the season rusty-tomentose: leaflets 3 to 5, round-oval, 1 to 1½ inches long, the width somewhat less, inequilateral at base, yet not abruptly so, both margins ending below somewhat cuneately, in general deeply, closely and sharply serrate, the very apex a triangular cusp broader than high, the whole of an almost leathery texture, the veins not obscure on either face and as to the upper face hispidulous-scabrous, all the lower face, veins and all, more closely hispidulous: corymbs short-peduncled: berries black, apparently without bloom, also thinly puberulent.

Collected somewhere in the mountains back of Santa Barbara, Calif., in September, 1908, by Alice Eastwood; her n. 218 as in U. S. Herb.

Sambucus fimbriata. All parts, even the tenderest young twigs, glabrous, the branches of a year old with a smooth cinnamon-brown bark without trace of lenticels: leaves of quite subcoriaceous texture, the leaflets 5 to 7, round-oval to oval-elliptic, very large and broad, from 2 inches long and 1½ inches wide in the smallest pair to 3 in length and 2 in width

in the terminal one, very unequal at base, one side there ¼ to ⅓ inch shorter than the other and both sides ending almost truncately, the margins so deeply and closely serrate as to appear in a manner fimbriate, each serrature ending in a slender point of some length, the very apex of each leaflet an abrupt subulate entire point ¼ to nearly ½ inch long: inflorescence broad and flat-topped; fruit not seen.

Collected in the Canada de las Uvas, mountains of Kern Co., Calif., at an altitude of 2,700 feet, by Coville and Funston, 5 July, 1901, being n. 1165 of the Death Valley Expedition collections. Allied to *S. caerulea*, Raf., as habit, foliage and flowers plainly tell.

The two following are of the red-berried division of the genus; and there are clear indications of the existence of yet other species remaining undescribed, especially on the Pacific slope of the continent.

SAMBUCUS ACUMINATA. Shrub low, the scales of its large winter buds ovate, acute, scabrous-ciliolate; growing branches, rachis of leaves, also veins of leaflets on both faces scabrous, often almost hispidly so: leaflets 7, approximate, 3½ to 5½ inches long, lanceolate, acuminate, rather unequally serrate except as to the abrupt and long acumination, this mostly entire; base of leaflet unequal, the shorter margin ending acutely, the longer obtusely: thyrsus on a stout peduncle of 2 or 3 inches, the cluster of large red berries broader than high: seeds rugose.

Apparently frequent at subalpine elevation in the isolated San Francisco Mountains of northern Arizona. The oldest specimens in U. S. Herb. were gathered by Edw. Palmer in 1869 and consist of flowering branches only. The same was obtained in 1901 by both Leiberg and McDougal; also by Brandegee in 1902; all these in flower only, but at agreement in the marked characters of the foliage both as to form and indument. The specimens in mature fruit were obtained in Sept., 1909, by G. A. Pearson of the U. S. Forest Service.

SAMBUCUS BOREALIS. Branches of the preceding year in their maturity cinereous as if with bloom, but the growing ones of the season not at all glaucous, obscurely scabrous-puberulent: mature foliage remarkably small for that of an elder bush, the leaflets 5 only, oblong-elliptic, 1½ to 2½ inches long, very closely and evenly serrate, ending at apex in a sub-falcate acumination, the base cuneate, but obliquely so, the longer margin and the shorter tapering to the short but definite petiolule, the texture thin, upper face glabrous, the lower tomentulose: fruiting thyrsus of red berries rather ample, the small oval seeds strongly rugulose.

Itaska Lake, Minnesota, collected in June, 1891, by J. A. Sandberg; his n. 1086 as in U. S. Herb. The small size of the foliage and the peculiar indument of it are both very characteristic.

A New Name for the Bayberries.

At the time of presenting the former paper on the nomenclature of the Bayberries (page 37 preceding), I did not suppose that any one would find it needful to propose a new Latin name for them. I thought that among a goodly number of such as had been proposed already, some one or another would be found valid. But Mr. Tidestrom, in a recently issued fascicle of the *Elysium Marianum* has not only distinguished two genera of these shrubs, but has assigned a new name to each, ANGEIA for the original type of *Gale*, and CEROTHAMNUS for the true bayberries of North America.

The most significant action here is that of the suppression of the name *Gale*; this presumably for the reason that it is an English vernacular or common-people's plant name. Dodonæus (1583), himself a Belgian, merely records this common name in the form of *Gagel*, but does not regard it as admissible into Latin nomenclature, and formally assigns it

the name *Chamelaeagnus* (Pempt. 768). Still earlier the type had been known by the two-worded generic name, *Myrtus Brabantica.* Gerarde (1597), though using English in his text, gives all the Latin names that have ever been proposed, and also three English generic names, one of which is Gaule. Mr. Tidestrom seems to have found J. Bauhin (1650) the first Latin writer to employ *Gale* as a Latin generic name. John Ray, in his Latin *Historia Plantanum* (1688), while citing at the head of his chapter Bauhin's *Gale*, yet himself prefers Dodonæus' *Chamelaeagnus*, as appears from his concluding sentence. The Danish herbalist, Simon Pauli, had expressed the belief that this shrub of Europe, the leaves of which were used in Denmark for a tea, is the same as *Thea* of the Chinese ; to which Ray objects somewhat impatiently : " *Thea* is a shrub as far from being related to *Chamelaeagnus* as China is distant from Europe." Nevertheless Ray, in his *Synopsis* (1696) accepts *Gale* as the Latin name of the type. Tournefort (1706), Petiver (1717), Dillenius (1719), Vaillant (1727) and others of the period maintain it without questioning its fitness to serve in that capacity ; and after its attempted suppression by Linnæus (1737), it was restored by Du Hamel (1755) and by Adanson (1763). Even as late as 1902 it figures as the generic name of the type in a monograph by Chevalier, cited in the *Elysium Marianum.*

So then, during some 250 years there appears quite a splendid succession of botanical authors who found no fault with *Gale* as a Latin generic name ; and there may be ground for questioning that this name is in the same category with such other vernacular names as Gansblum (Gooseblossom), Hondbessen (Dogberry) and one or two others that were seriously proposed by Adanson. Neither *Hondbessen* nor *Gansblum* has been adopted by any one hitherto, in as far as I am aware ; and the reason for neglecting them is plainly this, that being such as a Teutonic peasantry has assigned them in the terms of their own vernacular, they are unfit to serve as generic names in Latin botany. To show the ridiculousness of approving such names we have but to suppose the name *Erophila verna*

reduced to a synonym by so imbecile a proposition as *Gansblum verna*, or what would be no worse, *Gooseblossom verna*. No botanist of our country was ever so unlettered or so crude of intellect that he would have been willing to adopt, if it had been proposed, such an appellation as *Dogwood florida*. In order that, as a generic type, with binary name, the tree be so accredited in books that use a Latin nomenclature, the name dogwood may be turned into Greek, and then we shall have *Cynoxylon floridum*, a name which will not offend, but rather commend itself to the mind of every even half-taught botanist.

But now, as to the case of Gale, it may be questioned whether this name is in the same category with Gansblum and Hondbessen. It must not be overlooked that, while the last two obtain the same pronunciation in Latin which they have in Dutch or Flemish, and are therefore each exactly the same in Latin as in the vernacular, it is otherwise with this English name Gale; for here, in the vernacular, the final vowel being silent, the word is a monosyllable. In Latin the final vowel is pronounced, and so, without alteration by a single letter, the word is now dissyllabic. There is, then, this one very wide difference between Gale English and Ga-le Latin. Nor is this all; for even the vowel *a* has in Latin quite another sound than that which belongs to it as an English word. In view of these considerations, which arise from the principle that a word is a word, not according to how it is written but how it is spoken, it does not seem to be well settled that *Gale* Latin is not available for the Dutch Myrtle.

As regards the new name CEROTHAMNUS for our Bayberry shrubs and trees, it seems as if some statement ought to have been made of the reasons for ignoring Rafinesque's name *Cerophora*. As I glance at the pages of Rafinesque wherein these shrubs are treated of, I perceive such transposition of types, and consequent uncertainty about the application of his new names, generic and subgeneric, as invites to the ignoring of his nomenclature of them altogether.

In that tract of his wherein the Bayberries are dealt with,[1]

[1] Raf. *Alsographia Americana*, pp. 9–12.

the first thing which the author does is to transfer that old Greek name *Myrica* to yet another American type, different from that to which Linnæus had applied it; and this done, and the Linnæan type being for the moment without a name, Rafinesque hastens to invest that with a new name, *Cerophora*. Let us remark in passing, that we are not to censure Rafinesque for thus taking a name away from an old genus, applying it to a new one, and then creating a new name for the old genus. He was a professed disciple of Linnæus; and this kind of trick he learned from Linnæus, who practiced it a hundred times and more; and his disciples for a hundred years kept it up.

As for *Cerophora*, and its applicability, the first lines of Rafinesque's paragraph indicate his purpose to have been mainly that of being rid of the name Gale, which he says is Dutch, whereas in truth it is English. But, passing from the consideration of the name *Cerophora* as a substitute for the Linnæan *Myrica*, to what particular type does the new name apply? When the author immediately after the name cites *Gale*, Tournef. as its equivalent, we seem compelled to regard *Myrica Gale*, Linn. as its type; but yet, the very name *Cerophora* seems to contradict that; for the gale shrub is not wax-bearing. And the thought is contradicted again when, proceeding to define two subgenera of *Cerophora*, he plainly makes our exclusively American wax-bearing shrubs the typical subgenus. There must, then, forever remain two opinions as to the tenability of *Cerophora*, Raf.; and I find myself at accord with the author who has proposed the new name CEROTHAMNUS.

Miscellaneous Specific Types.—III.

Abronia latiuscula. Root not known, probably perennial: stems a foot long and more, evidently procumbent, stoutish and firm, rather loosely leafy and floriferous, the internodes 2 inches long or more, purplish and very glaucous, glabrous, or with only here and there a scabrous hair: leaves short-petioled, flat and suborbicular, the lowest quite orbicular, 1½ inches long and broad, the later smaller and manifestly broader than long, some of the floral round-ovate, all very obtuse, the petiole mostly somewhat shorter than the short blade, this green and nearly glabrous on both faces, but above dotted sparsely with whitish low pustules, the texture thinnish: petioles firm, quite surpassing the leaves: bracts of the inflorescence not large, oval or ovate: perianths of middle size, the tube flesh-color, the limb white or pinkish: fruits small for the plant, obtusely and unequally 5-angled, puberulent on the sides, viscid-hirtellous at summit.

Plant from Fallon, Nevada, obtained in the spring of 1910; name of collector not known.

Apocynum abditum. Of the alliance of *A. cannabinum* and as small-flowered, but flowers white: plant 2 feet high and slender, glabrous except as to lower face of foliage: leaves lance-oblong to elliptic, the lower and larger 2 to 2½ inches long, those of the ascending branches half as large, all deep-green above, with light-colored veins, glaucous beneath and with a sparse villous-hirsute hairiness along the veins: flowers produced only in terminal compound cymes, not very numerous in the cyme; sepals white, lanceolate, acuminate, nearly as long as the corolla, this white, campanulate, the lobes oblong-oval, scarcely acute, spreading campanulately.

In moist soil, in the bed of a deep cañon at some point in northern Arizona, 1909; the collector G. A. Pearson. The species decidedly an elegant one; the properly terminal cyme quite surpassed by those at the ends of the laterals, this quite as in *A. cannabinum*, the common green-flowered species of

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the Atlantic States; but the corollas are very different in form as well as color.

BATRACHIUM USNEOIDES. Doubtless perennial, certainly wholly submersed, the naked basal part of the long stems slender, gradually stouter upwards, from below the middle made up of short internodes, the ample dense coarsely capillary and sessile leaves concealing the stem whether in the water or withdrawn from it; leaf-segments unusually coarse and firm, not collapsing, scarcely reduceable by pressure and not drying to a flattened mass, the whole branch thus densely clothed appearing much like a tuft of some dark-colored lichen: flowers on stout peduncles and little exserted from the mass of usneoid leaves; sepals oval, glabrous, spreading; corolla white, apparently almost ¾ inch wide in full expansion: carpels not seen.

Lake City, Arkansas, collected by A. H. Howell, 1 May, 1910. The label carries no information as to whether this grows in stagnant or running water. By the density, coarseness and stiffness of its foliage, it is strongly in contrast with all other species known to me.

GERARDIA NEOSCOTICA. Low annual, 6 to 9 inches high, the smaller simple, the larger branched from near the base, the branches ascending, floriferous almost throughout and very leafy: stem and branches plainly angular, wholly glabrous: leaves large for the plant, an inch long or more and of notable breadth, being narrowly lance-linear rather than linear, only sparsely scabrous-roughened above, the margins strongly scabrous-serrulate: flowers small for the plant, mostly alternate, shortly and slenderly pedicellate: calyx-tube veinless, its teeth or segments notably large and foliaceous, also obviously unequal, the larger exceeding the tube in length, glabrous except as to the plainly scabrous-serrulate margins; corolla purple, little exceeding a half inch in length, the lobes of the not widely spreading limb extremely short.

Known only as collected by the writer, in an open space

among thickets of sweet fern and blueberry bushes, near Middleton, Nova Scotia, 12 August, 1910. By its long calyx-lobes and almost tubular corollas the plant fails to fall into that aggregate of lesser gerardias called *G. pauperpaula.* I say aggregate because this last is one thing as it occurs in New England, and quite another as a denizen of western Ontario, southern Michigan, and elsewhere about the Great Lakes. I am unwilling to undertake the segregating of them, however, until I have the better knowledge of them that comes of field study of each in its own region.

GERARDIA MESOCHORA. A foot high, more or less, simple to above the middle, there parted into several slender branches, these floriferous for more than half their length, the flowers usually alternate: stem and branches not strongly angled and their roughness obscure: leaves narrowly linear, seldom notably acute, rather strongly muriculate-scabrous above: flowers rich purple, large for the plant, the corolla commonly more than an inch long, in full expansion as broad as long, its lobes much broader than long and nearly truncate: anthers not exserted nor very copiously hairy, but one side of the filament excessively so and its hairs greatly elongated: fruiting capsule depressed-globose, distending the calyx-tube, hardly surpassing it, the calyx-teeth as short stout subulate points arising above it.

To this description answers a plant common in the Western Midland and prairie regions of northern Indiana and Illinois, Wisconsin, Iowa, Minnesota and even eastern Nebraska. In northern Illinois and southern Wisconsin, I knew it familiarly in earlier years, never doubting that it was, what every one has hitherto called it *G. purpurea.*

The eastern plant, that is, of the Eastern and Middle States, which most resembles this, and which may or may not fitly bear the name invented by Linnaeus, has stems more angular and scabrous, corollas not as large by one-third at least, its flowers opposite on the branchlets, and a capsule which is truly globose, not so greatly distending the calyx-tube, and

which commonly surpasses not only the tube, but the calyx as a whole, sometimes inclining even to oval, but never depressed globose.

My last field observation of *G. mesochora* was made at Knox, Indiana, late in August, 1899; and the specimens made then and there, preserved in my own herbarium, are the best I have seen, and are typical of the species.

GERARDIA CRUSTATA. Annual, stoutish and rigid, erect and rather strict, the few and more or less definitely paniculate branches strongly ascending, only the more or less crustaceous angles scaberulous: leaves narrowly lance-linear, firm and hard, glabrous on both faces but the whitened and crustaceous margins scabrous: flowers mostly alternate, subsessile, forming a rather dense spiciform inflorescence: flowers not large for the plant, the purple corolla but ¾ inch long, all its lobes rather lightly ciliate, broad and obtuse, or the middle one and largest definitely emarginate, or at least retuse: fruiting calyx campanulate, exceeded by the oval capsule, its segments rather deep, triangular-sublate, its whole margin, as well as the midvein, showing the white incrustation.

Sapulpa, Indian Territory, 21 Sept., 1894, collected by B. F. Bush, and distributed by him erroneously for the *G. heterophylla* of Nuttell. Type specimens in my herbarium.

GERARDIA LANGLOISII. Commonly 2 feet high, stoutish, much branched, in appearance shrubby or at least suffrutescent, yet probably only annual, the mode of branching quite strict: stem and branches strongly scabro-hispidulous both on the angles and between them: leaves all small for the plant, narrowly linear, scabrous: flowers small for the plant, subsessile, approximate, always alternate on the many short strict suberect branches: corolla purple, ¾ inch long, its tube uncommonly long, narrow and not ventricose, very densely strigose-pubescent, the lobes of the limb not large, more than usually unequal: calyx under the flowers rather deeply campanulate,

its teeth very short and broad; fruit and fruiting calyx not seen.

Known only as collected by the late Father Langlois, in prairies near Eunice, Louisiana, 12 Sept., 1894.

GERARDIA ASPRELLA. Annual, 2 feet high or less, loosely and widely branching above the middle; everywhere muriculate-scabrous, but the roughness shorter than in the preceding: leaves narrowly linear, not acute, strongly revolute, those of the inflorescence more lance-linear and with clear distinction of blade and petiole: flowers mostly alternate, distinctly and rather slenderly pediculate: calyx under corolla (the fruiting not known) marked by 5 raised and very scabrous veins running each to the end of the short deltoid and incurved tooth: corolla ¾ inch long or more, its tube rather narrow and not ventricose, the limb notably wide in proportion, the throat, and also the stamens long-hairy.

Near St. Martinsville, Louisiana, 27 Sept., 1892, A. B. Langlois. The collector, taking under consideration the roughness of the plant, and its only middle-sized and rather narrow corollas, had labelled his specimens *G. aspera* Dougl., to which the plants bear no particular resemblance.

STEIRONEMA GRAMINEUM. Small, rather weak and delicate but upright, 7 to 11 inches high, clothed throughout with very narrow linear leaves mostly 2 to 3 inches long, often subfalcately curved, neither very firm nor yet flaccid, sessile, the pairs almost connected at base and there with a substipular fringe as a connective, the blades all plane, entire, acute: flowers very small, mostly solitary and much scattered: calyx-segments triangular-lanceolate, attenuate-acute: corolla cleft almost to the base into oblong-obovate or oval cuspidate lobes, these dark-dotted; bases of the lobes granulate, but hardly so the long filiform filaments which greatly exceed the short oblong-oval anthers.

Species small and almost grassy by the narrowness of its foliage, known only by two sheets in U. S. Herb., col-

lected somewhere in the mountains of northern Alabama, in 1878, by G. R. Vasey. As to character of corolla and stamens the plant is very different from any and every other known member of the genus.

STEIRONEMA VERTICILLATUM. Stems simple below and stoutish, but parted much below the middle into many rather slender leafy and floriferous branches, the whole plant 1 to 2 feet high and rather diffusely paniculate: leaves small, lanceolate, the lowest on rather long petioles that are scarcely ciliate except at the very base; those of the many flowering branches more broadly lanceolate, subsessile in verticils of 3 to 6, the whole with as many flowers as leaves; calyx-segments ovate-lanceolate, abruptly acute, in fruit about equalling but not surpassing the capsule: anthers of a trifle greater length than the filaments, these roughened with sessile granules.

Leeds, North Dakota, 8 Aug., 1901, and again 22 July, 1906, collected by Dr. J. Lunell, and distributed by him for *S. lanceolatum* var. *hybridum;* but the plant that has been called *hybridum* is of the Carolinas, and most unlike this. The new species is named in reference to the fact that, while freely branching and copiously floriferous, nearly all the flowers are in verticils at the nodes formed by whorls of leaves. The plant appears to be almost aquatic; for, in the specimens, the lowest leaves have been prematurely killed by water in which the plants seem to have stood all through the time of their flowering and fruiting.

STEIRONEMA LUNELLII. Stoutish and low, less than a foot high, at base decumbent above a short stout rootstock: basal leaves small, round-oval, on long petioles much dilated at the insertion and devoid of hairs, the proper cauline ones lanceolate-oblong, obtuse at base, scarcely acute at apex, 1½ inches long, on petioles of less than an inch, these fringed at their dilated and almost stipular base only: floriferous upper part of plant branching freely, the leaves and flowers mostly in verticils: calyx-segments ovate, acute, a little surpassing the

mature capsule: bottom of corolla only sparingly granular, the granulation of the filaments not sessile.

Stout low plant growing along sloughs and ditches near Leeds, N. Dakota, and collected by Dr. Lunell in flower 6 July, in fruit 14 Aug., 1910.

The almost constantly verticillate character of the copious inflorescence of these two species marks them almost as a group of their own; this notwithstanding that in some other species one observes an occasional whorl of three or four leaves and flowers. In these it is perfectly and strongly characteristic, though this is far from being the principal character in either species.

Steironema pumilum. Not slender, nor yet stout as the foregoing, arising from a system of slender horizontal rootstocks, 3 to 7 inches high, simple except at summit and densely leafy: leaves all rather narrowly ovate, subcordate, very acute, 1 to 1¾ inches long, on short ascending or spreading petioles, these distinctly ciliate throughout: flowers only 2 to 6, all at the summit of the stem: calyx-segments oblong-lanceolate, not notably acute, little surpassing the capsule: granulation of the bottom of the corolla dense, also extending conspicuously half way up the segments: anthers much longer than the filaments, these broad, but hardly subulate.

Collected in damp meadows at Leeds, North Dakota, 21 July, 1910, by Dr. Lunell, who in full notes accompanying the specimens, has clearly pointed out its characters as distinct from the larger plants of the region, which the collector has taken for *S. ciliatum* of the books, namely,

Steironema membranaceum. Much more slender than *S. ciliatum*, 2 feet high, simple to the summit and there very few-flowered, all but the terminal axils vacant: leaves all ovate, acute, obtuse at base but not subcordate, 2 to 3 inches long, deep-green and of thinnest texture, the margins delicately and closely serrulate-ciliolate, their petioles ½ to ¾ inch long, distinctly but delicately ciliate: segments of calyx

lanceolate, acute: base of corolla only very sparingly granular; filaments more nearly ligulate than subulate, smooth and glabrous, very short, of much less than half the length of the much elongated anthers.

Occurring in thickets, at Towner, N. Dakota, and collected in fine specimens by Dr. Lunell, 21 July, 1908; apparently distributed by him for *S. ciliatum*, the best that could have been done by any botanist guided by nothing better than the indefinitive and loose descriptions of that species that are in all the books.

Nothing, however, at present existing in herbaria, whether from North or South, East or West, has at all the characters that mark conspicuously as new this present plant.

Some Southwestern Mulberries.

Almost fifty years since Mr. S. B. Buckley published a new kind of mulberry bush from western Texas under the name *Morus microphylla* (Proc. Philad. Acad. vol. for 1862, p. 8). The leaves, as the name indicates, were very small for those of a mulberry, and Mr. Buckley reported that the species was not a tree, but a mere bush. It was the product of its dry and over-heated southwestern desert environment. After this, as in the course of events botanical exploration was carried further westward by hundreds of miles, and into still more starved and arid regions, that is, into New Mexico, Chihuahua and Arizona, mulberry bushes, smaller and with still smaller foliage were collected and sent in as "*Morus microphylla.*" The name fitted, and that was enough—is always enough—with the indifferent and indolent multitude of people botanical, to warrant the application of Buckley's name to all of them.

With not much less than half a hundred good sheets of specimens of these things before me, I think I can not do better than indicate some of the specific differences which I readily detect in this aggregate of small mulberries of the Southwest; and, since the original description published by

Buckley is too meager, and leaves out of the account some good points, I attempt at the outset to give a new description of it.

Morus microphylla (Buckley, l. c.). Twigs of the season on mature fruiting branches of a light reddish brown and obscurely puberulent, the branches glabrous: leaves of such branches and branchlets without lobe or sinus, of ovate outline, though often distinctly inequilateral, 1½ to 2¾ inches long, 1 to 1¾ inches wide below the middle, at base not subcordate but nearly truncate, crenate-serrate except as to the abrupt and prominent entire apical point; the texture very firm, both faces almost alike green, the upper glabrous and smooth, yet under a lens closely low-tubercular, the tuberculation absolutely blunt as well as low; lower face of a rather more vivid green, roughish to the touch by the presence of minute and sparse hispidulous hairs on the veins, and even on the general face: petioles firm, ½ inch long or more.

This description is drawn wholly from specimens obtained near Austin, Texas, by Mr. F. V. Coville, 27 May, 1904. I use them partly for the reason that they are the best specimens of all that are in U. S. Herb. from western Texas, and therefore lend themselves best to careful diagnosis. That the vicinity of Austin is the original station for Buckley's species I dare not say, for the reason that that author gives no closer geographic limit than "Western Texas." True, there are Buckleyan specimens at hand that were collected by him at Austin in 1881, and at that time sent to Dr. Vasey at Washington. These, however, were not type specimens, collected as they had been almost twenty years after his publication of the species. They are poor fragments: but they are plainly of the same species of which Mr. Coville gathered his excellent material. Nevertheless, what Buckley's original of 1862 may have been, and whence he had it, that is, from what particular station, I have no means of ascertaining. Also I doubt not that, having once established a species, he afterwards referred all western mulberry bushes to that, without discrimination. The original description has in it a vagueness that gives rise

in my mind to a suspicion that his species may have been an aggregate at the very outset. Here also I must remark that Mr. Coville had declined to give his own fine specimens any specific name at all, when consigning them to U. S. Herb. There are several mulberries in the arid West to which that name *microphylla* is more appropriate; so that the name has long been a misleading one to those who knew something of far southwestern mulberry forms in general.

I must now give account of another sheet of Buckley's specimens, also from Austin, gathered by him as early as 1875, and sent to Dr. Vasey. They are twigs from another tree, and are at an earlier stage of growth, being hardly out of flower; or else they represent a later flowering of perhaps a young and immature bush.

Twigs as in the other specimens as to color and faint traces of indument: petioles also the same: leaves of round-ovate circumscription, 2½ inches long, 2 inches wide, strongly 3-lobed and quite constantly of one pattern, the serrature more sharp and truly serrate, not crenate-serrate, the apex equally an entire acumination: texture much thinner, and upper face very distinctly muriculate- or even strigose-scabrous; lower face as in Mr. Coville's specimens save that the hispidulous roughness is more general and more copious.

Despite the discrepancies as to texture and roughness of foliage, which may be partly due to differences in age and maturity, I assume that all these sheets of specimens represent one species, and that probably the one to bear the name *microphylla* by right of priority, though not by right of reason and fitness.

MORUS PANDURATA. Branches and leafy twigs slender, somewhat flexuous, puberulent when young, later glabrate: leaves on slender petioles of ½ inch or more, subcordate-ovate in circumscription, some without lobe or sinus, some contracted in the middle and panduriform, their length 2 to 2½ inches, breadth toward the broad base 1¼ to 1¾ inches, abruptly mucronate, evenly subserrate-dentate, the teeth acutely and

prominently mucronulate, the texture firm-membranaceous, upper face deep-green and doubly muriculate-roughened, a larger and very sparse set of murications conspicuously hair-tipped, the many times more numerous intervening ones not at all so, and naked; lower face of a much more vivid green, also merely hispidulous along all veins and veinlets, otherwise glabrous: fruit not seen.

Kerrville, in arid western Texas, July, 1889, Munson Hopkins; the type specimens on sheet 218,836, U. S. Herb., labelled by some one as a *Celtis*.

MORUS ARBUSCULA. Apparently an intricately branched low shrub, the branches stout, rigid and divaricate, their bark light-gray; leafy and fructiferous twigs of the season green or somewhat reddened, obscurely puberulent: leaves numerous, approximate, slenderly short-petiolate, very small, ovate, sometimes very broadly so, obtuse or subtruncate at base, at apex abruptly rather long-acuminate, the blade as a whole an inch long or less in the smaller to barely 1½ inches in the largest, the margin with few and coarse serratures; leaf-texture very firm, the color of a very vivid green, deeper and less vivid above, brighter underneath, and there marked by whitish veins, upper face muriculately roughened, lower smooth, glabrous except as to a few small short hair-points on the larger veins: fruit small, nearly spherical on very short villous-hirsute peduncles.

A Texan species, collected on the Fredericksburg Road, about ten miles north of San Antonio, 7 May, 1910, by Mr. S. H. Hastings.

MORUS VERNONII. Shrub or small tree of slenderer habit, the branches of two and three years' growth pinkish gray and glabrous, those of a year old showing a trace of the short-villous subtomentose pubescence that is plain on the growing leafy twigs of the season: petioles slender, ¼ to ½ inch long; leaves of several patterns lobed and uncut on the same branch, all rather small, some with very distinct ovate-acuminate

terminal lobe well separated from a broad and more than twice larger lower part itself scarcely 2-lobed, such leaves being of round-ovate general circumscription above a subtruncate broad base, the whole 1¼ to 2 inches long, 1 to 1¼ inches across at and below the middle; uncut leaves mostly somewhat deltoid-ovate, truncate at base, about 2 inches long, 1¼ inches wide above the base, many leaves notably below these dimensions, the texture of all rather firm-membranaceous, color neither vivid nor exactly dull though light green, upper face of all with a few slender hirsutulous hairs on the veins only, the general area rough with many low but hairless muriculate points and scattered hair-tipped pustulations, lower face much more rough to the touch by many hispid short hairs on all veins and veinlets, as well as copious smaller and shorter ones on the general area; serrature of all sharp, but unequal: fruit unknown.

Of well marked foliar aspect and character, collected in June, 1901, by Mr. Vernon Bailey, in the Chisas Mountains, Texas.

Morus vitifolia. Twigs of the season somewhat villous-puberulent, traces of this indument obvious on branches of two or three years: petioles about ¼ inch long more villous: leaves much diversified in cut on the same branch, but those of the most vigorous sterile branches pronouncedly and elegantly somewhat 5-lobed, the terminal lobe almost the largest, somewhat rhombic-ovate, separated from the lower limb by narrowly oval almost closed sinuses, the lower limb of two lobes each with a short sinus below the middle suggesting its division into two; other strongly lobed leaves simply but deeply 3-lobed, with narrow but more open sinuses; uncut leaves less numerous, very broadly ovate, but at base truncate; dimensions from 1½ by 1¼ in the simpler form, to 2¼ by 1½ in the strongly lobed forms; texture of all rather firm-membranaceous, color rather vivid light-green; upper face low-tuberculate under a lens, and smooth to the touch or harsh according to the presence or absence of sharp hair tips,

lower face everywhere rough with hispidulous pubescence, this more pronounced on all veins and veinlets, but plentiful over whole area: fruit not seen.

The type specimens of this elegant grape-leaved mulberry bush are in U. S. Herb., as collected in the Doña Aña Mountains, New Mexico, 28 Aug., 1906, by Wooton and Standley.

MORUS GOLDMANII. Low slender shrub, in habit like the last, but smaller and with different foliage: growing twigs only obscurely and minutely puberulent, the red-brown branches glabrous: leaves all small, the largest only 1½ by 1¼ inches, the smallest less than 1 inch long, the lobed form inclining to be 5-lobed, its terminal part being more or less distinctly parted into 3 secondary lobes, the sinuses between this compound terminal lobe and the basal part of the leaf being not oval or in any way rounded, but rather openly V-shaped, the uncut leaves smaller and fewer, subcordate-ovate; texture hard, almost subcoriaceous, color light but dull green, the marginal indentation rather coarse and uneven, also more dentate than serrate, veins of the upper face sunken but hirtellous, the area rather coarsely and harshly muricate-scabrous, lower face villous-hirsute at base along the veins, the veinlets sparsely hispidulous, the area in general much more minutely, sparsely and sharply muriculate: fruit not seen.

Specimens in U. S. Herb. from an altitude of 4500 feet in the Little Florida Mountains of the extreme southwestern part of New Mexico, by E. A. Goldman, 5 Sept., 1908.

MORUS BETULIFOLIA. Stout and compact shrub with rigid and tortuous gray branches: growing leafy shoots rather slender, of a reddish brown and lightly villous-tomentose: fruiting branches with no lobed leaves, all being exactly cordate-ovate, 2 to 2¾ inches long, 1¼ to 1½ inches wide toward the base, coarsely subserrate-dentate and with an abrupt short acumination, those of vigorous young sterile shoots

evenly 3-lobed, about 2¾ inches long by more than 2 inches wide across the basal lobes, all leaves of firm-membranaceous texture and vivid-green on both faces, the upper face hispidulous along the veins and sharply pustulate-muriculate between them, lower face hirsute along the veins and strigulose-pubescent between them.

Of the Organ Mountains in southern New Mexico, where it was collected in copious and fine specimens by E. O. Wooton and P. C. Standley, 9 June, 1906, the collection well represented in U. S. Herb.

MORUS CANINA. Leafy twigs of the season reddish, glabrous, the branches yellowish: foliage as far as known without lobes; leaves smaller than those of *M. microphylla*, broadly subcordate-ovate, ¾ to 1¾ inches long, ½ to 1 inch wide, closely and sharply serrate-dentate, at apex subfalcately short-acuminate, subcoriaceous, dull light green and coarsely muricate-scabrous above, beneath of a yellow-green hue and polished, hispid along the veins, and with a sparse showing of pustulate-strigose hairs between them.

Dog Spring, southern New Mexico, 25 May, 1892, Dr. E. A. Mearns.

MORUS ALBIDA. Twigs of the season lightly velvety-tomentose, the maturer branches glabrous and of a decidedly yellowish gray: petioles ½ inch long, velvety: leaves of vigorous sterile branches 3-lobed and rather regularly so, about 2¼ inches long, 1½ wide, those of fruiting twigs cordate-ovate and much smaller, about 1½ inches by 1 inch, all evenly and sharply serrate as well as with a short acumination, upper face extremely rough with a close low tuberculation of which the very sharp points can be felt, but hardly seen with an ordinary lens, lower face rather softly strigose-pubescent, the veins and veinlets showing but few rather short and not very rigid spreading hairs; texture of leaf firm membranaceous, color of a decidedly light green.

Berend Creek, Sierra Co., New Mexico, 22 May, 1904, O. B.

Metcalfe, who reports that the tree grows in dry sand, at an altitude of about 5,000 feet in the mountains. It bears more likeness to *Morus alba* than do other southwestern species.

MORUS CRATAEGIFOLIA. Probably a small tree, the stout branches of two or three years light-grey, glabrous, but leafy twigs of the season, as well as the short stout petioles attached to them hirsute-tomentose: leaves small, of some diversity of form on the fruiting branches but in general broadly subcordate-ovate, coarsely serrate, abruptly acuminate, those inclining to be 3-lobed only incisely, not sinnately so, dimensions only 1 to 1½ inches by ½ to 1 inch; texture hard and subcoriaceous, color deep rather dull green as to both faces, the upper very harsh with coarse dense murications, lower strongly stiff-hirsute or almost hispid along the veins, the area rather sparsely, finely and very sharply muricate.

Collected at the mouth of the Blue River, a tributary of the Gila, in southeastern Arizona, 14 June, 1905, by Walter Hough. In what is their most usual cut, the foliage much resembles that of some of the more incised crataegi.

MORUS RADULINA. Branches more slender than in the last, neither quite straight nor yet obviously flexuous, only puberulent, not tomentulose even when growing: leaves smaller, broadly cordate, some without lobes, a greater number 3-lobed as in the last, more notably acuminate, the margins crenate-toothed: texture almost subcoriaceous, the upper face dull-green, minutely and closely muricate-scabrous, the points scarcely visibly hair-tipped, lower face of a lighter and more vivid green, hispid along the veins and veinlets, the general area between them only sparsely scaberulous: fruit unknown.

Specimens collected somewhere in Arizona, Aug., 1896, by B. E. Fernow; in what part of the State is not really indicated by the merely local name Beaver Creek.

MORUS CONFINIS. Fruiting twigs of the season densely leafy, reddish, villous-tomentulose, branches yellowish-brown, glabrous, foliage of fruiting branches very copious, the smallest

known in the genus, and uniformly devoid of lobes and sinuses, their outline subcordate-ovate, ¾ to 1¼ inches long, incisely and sharply serrate, and, for the size of the leaf coarsely so, the apex cuspidate, but hardly acuminate, the upper face dull, very roughly muricate-scabrous and with scarcely visible veins, the lower of a bright yellowish green, the much lighter veins and veinlets raised and very conspicuous, hispidulous with short hairs, the general area only sparsely and obscurely muriculate.

Santa Rita Mountains, extreme southern Arizona, C. G. Pringle, April and May, 1881. A sterile branch from the same locality, by David Griffiths, 1902, has nearly all its leaves regularly 5-lobed. Presumably it represents the same species.

MORUS MICROPHILYRA. Branches rather slender and tortuous, yellowish-brown and glabrate, but twigs of the season, as well as the short petioles and slender pedicels of the fruit quite villous: leaves of fruiting branches much diversified as regards width but none lobed, mostly of very broad cordate-ovate outline, some almost suborbicular, the more rounded 1 inch long and of the same width, the more ovate 1¼ inches long by 1 inch broad, all rather evenly and lightly serrate, the apex subfalcately short-pointed, both faces subcinereous and rather soft to the touch with a fine strigose pubescence: pedicels filiform, as long as the fruit itself.

Santa Eulalia Plains, Chihuahua, Mexico, collected by Mr. Wilkinson in 1885. The average pattern of the leaf here is precisely that of linden trees, though so very small; and the species is named in allusion to this.

MORUS GRISEA. Sterile branch stout, straight, at intervals of 2 inches parted into rigid ascending leafy twigs, the bark of both branch and twigs copiously short-tomentose: leaves of broadly cordate-ovate outline, 1½ inches long, of the same breadth just above the base, but deeply and regularly as well as quite constantly 3-lobed, the lobes subequal, or now and then the terminal lobe smaller than the two basal, this one always cuspidate-acuminate, the whole leaf margin rather coarsely serrate-toothed, the texture uncommonly firm, almost subcoriaceous, both faces colored much alike and subcinereous, the upper extremely rough with a dense investiture of hair-tipped pustular elevations, the lower densely hirsutulous along the veins and sparsely tomentulose between them, the whole lower face as soft to the touch as the upper is harsh and rasp-like: fruit unknown.

The fine specimen of this is on U. S. Herb. sheet 41506, and purports to have been collected forty years ago, by Dr. Edw. Palmer, at "Hell Cañon, Arizona"; I presume in the northwestern part of the State, in some arm or tributary of the Grand Cañon.

A Further Study of Agoseris.

It is now twenty years since the name *Agoseris* was restored by me to its place as the rightful name for a large cichoriaceous genus of western North America. In the paper wherein this proposition was announced (PITTONIA, II., 176–179) some twenty-three species were indicated. In the course of the two decades that have intervened, I have discovered and published a few others from various parts of the farther West. In the year 1906 Mr. Rydberg was able to list for Colorado alone twenty-two species, eight of these having been added to the Colorado flora by himself, and two of them by Mr. Geo. E. Osterhout, an excellent botanist resident in Colorado. Yet at the time when Mr. Rydberg was preparing the Flora of Colo-

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rado, one fine species from Colorado collected by myself in 1896 was yet unpublished. I place this first in the line of new species herein described.

In its vastness *Agoseris* almost seems to replace in this country *Hieracium* of the Old World. I think that something like seventy species have already been published ; and I should not wonder the number existing on the plains and slopes and summits of the West yet undiscovered should amount to seventy more. It would be no more remarkable than that there should be two or three hundred species of *Hieracium* on an equal extent of Eurasian territory ; and the number of two hundred species there in *Hieracium* is a very conservative estimate.

AGOSERIS LONGISSIMA. Plants 2 feet high and more, glaucous, mainly glabrous ; leaves erect, more than a foot long, narrowly linear, entire, acute, loosely curled-hairy marginally near the base, the plant otherwise wholly glabrous : heads small for the plant, the involucres rather many-flowered, but less than an inch high, the bracts all triangular-lanceolate, acute, the outermost shorter and a little broader than the others, without trace of pubescence : achenes about 5 lines long, very slender, tapering to a striated and hollow beak, this in those of the dark-colored outer series of less than one-third the length of the body, in the whitish median ones of nearly half the length of the body : pappus white, very delicate and fragile.

Collected only by myself, on the Little Cimarron River, 29 August, 1896, the specimens all in my own herbarium. Remarkable for the great height of leaves and scapes, and the small heads, but these on decidedly stoutish and firm scapes.

AGOSERIS VICINALIS. Plants a foot high more or less, with glabrous glaucous herbage and more or less depressed or merely ascending leaves, these lance-linear, entire, acutish, of less than half the length of the somewhat slender scapes, these usually decumbent at the very base, thence ascending or else quite erect : involucres rather many-flowered and broad,

less than ¾ inch high; bracts remarkably consimilar, all being narrowly lanceolate, the outer series not much shorter than the inmost, the number of series rather definitely two: achenes about 5 lines long including the stout beak which is not much shorter than the body; pappus soft, white, of nearly the same length as the achene.

Low prairies at Brookings, South Dakota, June, 1891, T. H. Williams; type in U. S. Herb. The locality is interestingly near to that whence the original of *Troximon glaucum*, Nuttall, came, which was Fort Mandan. Nuttall's plant, however, was said to have a much imbricated involucre of pubescent scales.

AGOSERIS ISOMERIS. Stout and low, glabrous throughout, glaucescent rather than glaucous, the scapes stout, strongly striate, 4 to 6 inches high and nearly twice the length of the depressed or ascending rather ample foliage: leaves oblong or lance-oblong, entire or the margins somewhat full and crisped, at apex merely acutish, the base narrower and petiolar: involucres ¾ inch high, rather many-flowered, the bracts in rather more than two series but of almost precisely equal length, the outer oblong or lance-oblong, the inner lanceolate, these acute, but hardly so the outermost: flowers apparently yellow: fruit not known, but doubtless beakless.

Fish Lake, Uintah Mountains, Utah, 18 July, 1902, Leslie N. Goodding. This plant, so well marked in habit, and with such a peculiar involucre, must be almost or quite alpine, the altitude of Fish Lake being nearly 9000 feet.

AGOSERIS TARAXACOIDES. Subalpine, with the habit of the last, but taller, the scapes 4 to 8 inches high, the leaves less than half as long, these deep-green but glaucous, variously toothed and pinnatifid, some closely and coarsely dentate, others more truly pinnatifid, but the lobes or segments divaricate, their margins at the base arachnoid-woolly, otherwise quite glabrous: scapes somewhat woolly, under the involucres; these 1 inch high or less, the outer bracts lanceolate, their

margins arachnoid-woolly, the inner long and lance-linear, acute, marginally naked: achenes nearly cylindric below the rather long beak, those of the outer series pubescent, the inner all glabrous; pappus copious, soft but not fragile, its length about that of achene inclusive of the beak.

At 8000 feet, near Marysvale, Utah, collected by Marcus Jones, 2 June, 1894; fine sheet of type specimens in U. S. Herb.

Agoseris caudata. Low rather slender subalpine perennial, the leaves and scapes from a strong but herbaceous taproot with sometimes a branched crown, this not in the least woody or caudex-like; herbage glaucous, glabrous: leaves much depressed, or else ascending, of about the length of the scapes, all from somewhat above the middle cut deeply into narrow strongly deflected segments, but the upper part of one entire narrowly linear and caudate-acuminate piece: scapes only 2 or 3 inches high, erect, each surmounted by a head rather narrow and few-flowered, but of extraordinary length, being 1½ inches high in mature fruit, including the pappus, the involucre alone 1 inch high or more; its bracts rather few, the outer oval and acuminate, the very long inner ones lance-linear: achenes very slender, linear-fusiform, 7 lines long inclusive of the slender and not short hollow beak; pappus firm, smooth, not fragile.

Singularly well marked species, from 8000 feet in Salina Cañon, Utah, collected by Marcus Jones, 15 June, 1894; type in U. S. Herb.

Agoseris confinis. Subalpine low stoutish perennial with branching caudex; herbage pale and glaucous, in the main glabrous also: leaves lance-linear, mostly entire, glabrous: scapes 3 to 6 inches high, ascending, or even at base quite strongly decumbent, somewhat sparsely or loosely flocculent at base, also strongly so under the involucre, this broad and many-flowered but scarcely ¾ inch high; short outer bracts triangular-ovate, the innermost lanceolate, none acute, all

purple in the middle and glabrous except marginally, there somewhat white-woolly: achenes including the short stout beak ½ inch long, the pappus soft, dull white, nearly as long.

Marysvale, Utah, and Buckskin Mountains, Arizona, at altitudes of 9000 and 10000 feet, Marcus Jones, Aug. & Sept., 1894; specimens in U. S. Herb.

Agoseris longirostris. Crown of root simple or branching but fleshy like the root, not subligneous; scapes erect, a foot high; herbage very pale and glaucous, mainly glabrous: leaves ascending or suberect, 4 to 6 inches long, very narrowly linear, attenuate to a long almost filiform summit, mainly entire, some with a few remote short teeth, others as many short slender lobes, all perfectly glabrous: scapes slender, showing a few long soft hairs almost throughout, but more conspicuously below the middle, terminally under the head scantily white-woolly; involucres an inch high, subcylindric, the bracts very white but showing purple dots, the outer oblong, acute, scantily and even interruptedly woolly-ciliate: achenes long and slender, tapering very gradually to a slender beak (not pappus stipe) of their own length.

At 9000 feet, near Fish Lake, Utah, Marcus Jones, 4 Aug., 1894. An elegant plant by its almost filiform foliage, remarkable for the length of the beak of the achene, for the plant is of the *A. glauca* group.

Agoseris longula. Scapes stout, 2 feet high, but foliage only one-third as long, the whole plant glaucous, also glabrous as to all the vegetative organs: leaves narrowly linear to lance-linear, acute, often entire, as often with here and there a short salient tooth: involucres many-flowered, 1¼ inches high, bracts more numerous than in the last, in three series, all triangular-lanceolate, acuminate, the outermost series of about one-third the length of the innermost, the tapering upper part of the middle series more or less distinctly bristly-ciliate: achenes 6 lines long, extremely slender, the beak though slender striated, nearly half as long as the body; pappus fragile.

Type specimens collected by myself on prairies of the Humboldt River at Deeth, Nevada, 14 July, 1896. Mr. Heller's 9130, from Deeth, in 1908, has oblong-linear rather short foliage, but scapes and heads as in *A. longula*, though the bracts of the involucre are wholly naked. The achenes in his specimens are far from mature.

AGOSERIS LAPATHIFOLIA. Large and rather coarse perennial, with stout scapes 2 feet high, and rather ample foliage of 4 to 8 inches length; herbage glabrous and greenish, not glaucous but glaucescent only: leaves lanceolate, acute, entire, narrowed very gradually below to a short winged petiolar part not amounting to a petiole; heads broad and many-flowered, but the involucres barely an inch high, their bracts lanceolate, acute, glabrous, the outer only shorter and more herbaceous than the inner: achenes with stout beak one-third as long as the body; pappus rather firm, scaberulous, much longer than the achene.

Above Houston, Idaho, L. F. Henderson, 1896; his n. 3681 as in U. S. Herb; the broad foliage remarkably green rather than pale and whitish, and quite recalling the foliage of dock.

AGOSERIS LACERA. Tall and rather slender perennial, the scapes erect from the very base and 2 feet high, the foliage suberect, more than half as high, this and the scapes below the middle clothed thinly with long sordid crisped hairs, but all the herbage very pale as with bloom: leaves linear, long-attenuate at apex, usually entire below the middle, above it cut deeply into a few subulate-linear nearly straight and ascending or suberect segments: heads very small for the plant, the involucres only ¾ inch high, its bracts all lance-linear and consimilar, the outer as usual shorter, but in proportion not much broader, all attenuate-acute and villous-ciliate: achenes short and shortly beaked, the whole hardly as long as the fine barbellulate white pappus.

Pullman, Washington, 28 July, 1899, C. V. Piper, in U. S. Herb., under the collector's n. 3027.

AGOSERIS MICRODONTA. Coarse and tall perennial of low meadows, the stout scapes 1 to 2 feet high and more supporting large many-flowered heads, the leaves not rarely a foot long and more; herbage pallid and glaucescent, glabrous in the main, the scapes and leaf-margins at least, sometimes the leaf surface, more or less crisped-hairy: leaves lanceolate, narrowed gradually to a distinct winged petiole, its margins lanate-ciliate even in leaves otherwise glabrous, most leaves saliently if even remotely denticulate, in some plants with few and larger teeth: involucres 1½ inches high, 1 inch broad at summit, the summit of the scape under them either tomentose or scarcely so; bracts many and imbricated, none very broad, the outermost triangular-lanceolate, the rest more and more narrowly lanceolate, all villous-ciliate, sometimes also appressed-villous on the back, all the pubescence brownish: achenes 7 lines long including the hollow beak, this more than half as long as the body, the outer series dark-colored and very strongly serrulate-scabrous at summit, those next in order pale, less scabrous, the central all abortive; pappus not as long as the achene, very fine and fragile.

Coarse large species of southeastern Washington, said to be common about Pullman, in low meadows, where it has been collected and distributed by Mr. Piper and by Miss Hardwick. There are three good sheets of it in U. S. Herb., of the years 1901 to 1905.

AGOSERIS PROCERA. Very large and stout, the scapes 2 feet high, the foliage ample, upright, a foot high or more; herbage wholly glabrous, of a dull pallid green, merely glaucescent, blackening in the drying: leaves narrowly lanceolate above the long and rather wide petiolar basal part, sparingly and variously toothed, attenuately acute at apex: involucres many-flowered, an inch high only, but quite as broad, the numerous bracts all narrow, much imbricated, triangular-lanceolate, slenderly acuminate, some obscurely villous-ciliate toward the apex, otherwise glabrous; ray-flowers apparently more or less villous-arachnoid externally: achenes not known,

but by inference from the shortness of the broad heads, little elongated and shortly if at all beaked.

Largest of the genus as far as known, and from near Ellensburg, Washington, 17 June, 1897, by Kirk Whited; his n. 507 as in U. S. Herb. By the much imbricated and slender involucral bracts the plant recalls the genus *Scorzonella*.

AGOSERIS LANULOSA. Low perennial with branching caudex above a deep-seated taproot; scapes rather slender, 2 to 4 inches high; foliage half as long or less, inclined to be depressed, the whole plant pale as with bloom and almost canescent with a thin coat of fine downy-looking tomentellous pubescence: leaves oblong and lance-oblong, acutish, mostly entire, some with a few short salient teeth, some retrose, others falcately ascending: involucres many-flowered, not small for the plant, nearly ¾ inch high, their bracts rather definitely in 3 series, the outermost ovate, the middle oval, the inner narrowly lanceolate, all except the inner finely tomentellous, most strongly so on the margin: achenes, slender-fusiform, their stout hollow beak of nearly half the length of the body; pappus uncommonly short.

Kittitas Co., Washington, J. S. Cotton, his n. 1752 as in U. S. Herb. No special part of the county is named. The plant is evidently subalpine in the mountains there.

AGOSERIS VESTITA. Stout low subalpine perennial, older plants with branching caudex, the branches covered below with a scaly coat of old leaf-bases, the stout scapes 2 to 6 inches high and of about twice the height of the foliage, the herbage merely glaucescent underneath a thin coat of tomentellous pubescence: leaves elongated-oblong, most of them entire or but obscurely denticulate, a few with several salient triangular teeth: involucres broad, ¾ inch high, the bracts broad and much imbricated, the outer ovate, acute, the very innermost series broadly lanceolate, all much obscured by a dense woolly tomentum most copious on and along the margins, thinner on the back of the bracts: achenes short,

subcylindric, hardly even narrowed at summit, the long firm pappus sessile on the body of the achene.

Rocky ground at 8000 feet on Mt. Rainier, Washington, C. V. Piper, 1895; his n. 2149 as in my herbarium.

AGOSERIS ANGUSTISSIMA. Tufted perennial, with numerous upright slender scapes about a foot high, and the narrowest of leaves about half as long, either upright or ascending, not depressed; the whole plant pale and glaucescent: leaves very narrowly linear, attenuate-acute, glabrous above, but basally crinite-ciliate, the whole leaf commonly quite entire, yet very often showing one or more pairs of narrow subfalcate lobes or segments an inch long or less: peduncles lanulose under the involucre, the woolliness extending up along the margins of the bracts, these lance-linear and elongated, not even the outer series much wider than the inner, but only shorter: flowers few in the head, apparently rose-red: achenes consimilar, slenderly fusiform, much exceeded by the slender beak, the very delicate and fragile pappus still longer.

Fir glades, bordering the eastern shore of Diamond Lake, extreme southeastern Oregon, collected by Coville and Applegate, 6 August, 1897; also by the same collectors, on 17 August in the same year, shore of lake south of the Three Sisters, in the Cascade Mountains; copious and fine specimens in U. S. Herb. The plant has been taken by some one for *A. aurantiaca*, and the specimens are so labelled, but the nearest affinity is *A. gracilens*, a name which better befits this plant than it does the real thing that is so named.

AGOSERIS VULCANICA. Stout, low, the upright scapes and ascending foliage from a branching caudex, the scapes not greatly surpassing the leaves and 6 inches high or less: leaves glabrous, oblong-linear, rather blunt at apex, though tipped with a gland-like mucro, mostly entire, some with an obscure tooth or two on either margin: flowers unknown: scapes sparingly hairy above the middle, densely so under the head, the bracts woolly-ciliate, otherwise glabrous or nearly so, the

outer oblong-lanceolate, the inner lanceolate, all dark-purple except as to the green margins: achenes fusiform, purple, stoutly short-beaked, the pappus long, not very delicate, yellowish-white.

Strongly marked low glaucous species known only as collected by Mr. F. V. Coville, 14 Sept., 1902, "on a slope of firm pumice gravel," in the Crater Lake National Park, Oregon.

AGOSERIS COVILLEI. Size of the preceding, but caudex mostly simple: leaves linear to lanceolate, acutish, not gland-tipped, glabrous, some entire, others variously somewhat crisped and irregularly toothed: scapes little surpassing the leaves, sparsely curled-hairy throughout: involucre broad, its outer bracts ovate-lanceolate and short, the others gradually narrower, all sparsely curled-hairy on the back, naked or nearly so marginally: flowers large, yellow: mature achenes unknown, but without doubt short-beaked.

Collected by Mr. Coville at the same place and date as the foregoing, this one in full flower, the other in fruit only; the two species notably dissimilar.

AGOSERIS DECUMBENS. Low perennial with depressed leaves and decumbent scapes resting on a simple taproot without definite intermediary caudex: leaves glaucous, entire, linear but above the middle tapering to a long acute apex, glabrous except as showing a few long loose marginal hairs near the base: scapes stoutish, not notably striate, the longest 4 or 5 inches long, loosely hairy at base and to above the middle: involucres ¾ inch high, glabrous, the bracts in about 3 series, all lanceolate, the inner series not narrower than the outer, those of no series acute, not yet notably obtuse: achenes whitish, narrowly fusiform, with distinct but very short white beak, this supporting a copious firm shining-white pappus that is longer than the achene as a whole.

Fir glade on east bank of Diamond Lake, Douglas Co., Oregon, 6 Aug., 1897, by Messrs. Coville and Applegate.

Species most distinct both in habit and character from *A. angustissima* which is of the same locality.

AGOSERIS PRIONOPHYLLA. Size and habit of the last, except that the foliage equals or even surpasses the scapes, the herbage similarly rather arachnoid-hairy: leaves when entire narrowly linear, most of them broader, the margin beset with rather remote broad and short two-fold teeth, or toward the apex smaller but very salient simple teeth: involucre little more than ½ inch high, its bracts broadly lanceolate, those of the outer series and of the middle one appressed-villous on the back and strongly villous-ciliate, the pubescence all straight and fuscous: achenes with short stout beak, and short firm dull-whitish pappus.

Mount Hood, Oregon, Aug., 1893, T. J. Howell; his n. 1939 as in my herbarium.

Very distinct from the last by its involucres and achenes; also very peculiar as to the double dentation of the leaves which seem beset with broad short teeth each broadly and deeply notched, as one sees the teeth in the large crosscut saws, so called, of the lumbermen.

AGOSERIS HOWELLII. Low and probably subalpine, the crown of the root often parted but not subligneous; scapes slender, 4 to 7 inches high, not greatly surpassing the suberect foliage; herbage deep-green, barely glaucescent, sparsely somewhat cobwebby-hairy: leaves broadly linear, attenuate-acute, entire or with few and remote elongated subfalcate segments; scapes tomentose under the involucre, this ¾ inch high, few-flowered and narrow, the bracts all lance-linear, obtusish, the outer series shorter and relatively broader, glabrous on the back, marginally short-woolly, the inner altogether glabrous: achenes nearly cylindric and linear, tapering quite abruptly to a not slender beak longer than the body: pappus not long, dull-white, rather firm.

Mount Hood, Oregon, Aug., 1881, T. J. Howell, his n. 142 as in U. S. Herb.; the species remarkable for the abruptness

with which the achene tapers to its beak ; yet is the plant in no way nearly allied to *T. retrorsum*.

AGOSERIS CINEREA. Perennial, the scapes stoutish, 2 feet high, the suberect foliage one-third as long, the whole plant glaucous, and also still paler by a coat of short roughish tomentellous pubescence: leaves of somewhat oblanceolate circumscription, obtusish, but tipped with a short gland-like mucro, the margin in some entire, in others with a few deep falciform segments or lobes: involucre 1¼ inches high, many-flowered, the bracts appearing as in but two very unequal series, the outer oblong-oval, acutish, the others narrowly linear-lanceolate and twice or thrice as long as the outermost, all glabrous for the most part, but some with tomentose margins: achenes small for the plant, linear-fusiform, surmounted by a delicate almost capillary pappus-stipe ¾ inch long; pappus rather short, its very firm bristles distinctly scaberulous and not fragile.

Santiago Mountain, Orange Co., Calif., June, 1901, Le Roy Abrams; his n. 1816 as in my herbarium.

Some Western Roses.

ROSA HELIOPHILA is a name that may be substituted for my *R. pratincola* published in 1899 (Pitt. iv. 13), for there is a *Rosa pratincola* of Europe, by A. Braun, which was published in 1888.

In the dozen years that have passed since I named and described this half herbaceous rose of the sunny prairies of the middle West, several other forms like it in its low stature, merely suffrutescent growth, and corymbose terminal inflorescence, have come to light, and may be named and defined here.

ROSA LUNELLII. Stems erect, simple, a foot high or more, armed rather densely with short and slender nearly colorless

prickles all straight and spreading; infrastipular spines none: leaves of a livid bluish-green on both faces, but in age quite glaucous, the rachis faintly short-villous, often with here and there a small prickle, also a few small subsessile glands; stipules broad and entire, yet mostly revolute, thus seeming narrow, those of vigorous growing shoots often closely beset with sessile glands, but of older and flowering shoots glandless; leaflets of young shoots 9, of older ones 7, or even 5, small, sessile, oval and oval-elliptic, finely serrate, smooth and glabrous above, scarcely pubescent beneath except along the midvein, and this only lightly so; but margins more loosely villous: flowers corymbose; peduncles and calyx-tube glabrous; sepals marginally villous, the outside beset with many sessile or subsessile glands: fruit rather large, depressed-globose, orange-red.

Open borders of woodland about Devil's Lake, North Dakota, collected by Dr. J. Lunell, 18 Aug., 1910. Differs from *R. heliophila* in that (1) the whole plant is more glaucous, (2) the prickles are far more numerous, more equal in size, and far less firm, being hardly more than bristles, (3) leaflets of less than half the size, (4) of elliptic and not obovate outline, (5) sepals glandular with subsessile glands. The species is well isolated, geographically, from *R. heliophila*, which, however, is on the prairies of South Dakota, and of North Dakota, and with its own characters.

ROSA RYDBERGII. Stems erect, simple, less than a foot high, densely leafy, rather loosely armed with short stoutish straight and spreading prickles; infrastipular spines none: leaves very glaucous above, of something approaching copperas-green beneath, yet with a trace of bloom, the rachis beset rather closely with short-stipulate and subsessile glands of several sizes, also with a few stout short prickles; stipules entire as to the adnate part, this with, or more commonly without villous marginal hairs, the few lobes conspicuously crenate-serrate, glabrous; leaflets 7, large for the plant, very

notably petiolulate, broadly oval or even somewhat rhomboid-oval, deeply sharply and closely serrate, the acutish apex aristate-mucronate when young, this mucro deciduous, both faces glabrous, the lower marked with feather veins but no reticulation: flowers in a closely sessile terminal corymb: ovary glabrous; sepals apt to be glandular, the glands nearly sessile.

This fine well-marked rose of the subherbaceous group is known only as collected by Mr. Rydberg (his n. 1932), in central Nebraska, in July, 1893; the special locality being hills near Plummer Ford, Dismal River, Thomas County. Of the same low mainly herbaceous character as the foregoing, this plant is (1) glabrous, the leaflets (2) very notably petiolulate, (3) reversing the usual order they are very glaucous above, and of a deeper green beneath.

ROSA RUDIUSCULA. Stems 2 feet high, woody to the summit, but simple except as to flowering twigs, densely prickly, the prickles unequal, none very long, all slightly deflected, scarcely curved: leaves green and glabrous above, glaucescent beneath and there villous along the veins, the rachis similarly villous, but scarcely prickly or gland-bearing; stipules small, entire, obscurely villous-margined; leaflets 5 or 7, small for the plant, sessile, the terminals elliptic, laterals narrowly oval, all lightly closely and evenly serrate: peduncles and the whole calyx more or less obviously beset with short stout strongly gland-tipped bristles, but otherwise glabrous: fruit small for the plant, depressed-globose, the sepals persistent and closely reflexed over it.

Shrub said to be common in rocky woods in the northwestern part of Missouri, as collected by Mr. B. F. Bush, and distributed by him for *R. Arkansana*, under numbers 160, 167, 170, 208, etc., chiefly in the year 1896. It is plainly of the group of *R. heliophila*, often flowering like that only corymbosely at the end of a tall shoot of the season; but this tall shoot becomes a strong woody stem to flower the next year from mostly one-flowered lateral twigs. By characters

of leaf and fruit it is clearly distinguishable from the more common half-herbaceous thing so widely dispersed on open prairies. There are traces of this same *R. rudiuscula* in U. S. Herb. from Kansas and Nebraska, but no satisfactory specimens like these excellent ones by Mr. Bush.

The two roses next succeeding, while apparently of low growth and small, are removed from the *R. heliophila* alliance by a truly shrubby growth, lack of the dense bristly prickliness, and the presence of conspicuous infrastipular spines. Their habitat is far beyond the prairies, in the region of the Rocky Mountains.

ROSA FIMBRIATULA. Low, much branched, the branches slender, scarcely armed except by pairs of infrastipular prickles, these stoutish, straight, spreading; leaves small, green and glabrous on both faces, neither face shining, the lower paler; rachis very slender, but beset with a few singularly stout prickles and a greater number of short ones that are strongly gland-tipped; stipules broad and foliaceous for the size of the plant, entire, edged all around with short-stalked glands forming a close series; leaflets 7 or 9, small, short-petiolulate, broadly cuneate-obovate, very obtuse, deeply and finely serrate all around except at and near the base: flowers in corymbs of 3 to 5 at the ends of the branches: fruits small, depressed-globose, smooth and glabrous; sepals persistent, erect, more or less stipitate-glandular.

The type specimens of this are from Montana, and were collected by Lester F. Ward, in what year we are not informed; but they are autumnal specimens, the date being given as Sept. 1. The locality is specified as "Right bank of the Missouri River, 15 miles below Round Butte." Some one appears to have named the plant as *R. Californica* var. *ultramontana;* but a note attached to the sheet, in the hand of Mr. F. Crépin, reads "an *Rosa Woodsii*, Lindl.?" The trouble with *Rosa Woodsii* is, that no one can find, anywhere in the West, a wild rose answering to the description that Lindley

gave of it; for he attributed to it a foliage shining above, paler beneath; and there is no western rose known to us with leaflets polished or shining above. Moreover, he who will read Lindley's account of the origin of *R. Woodsii* will see that its pedigree is quite too mythical. The seed from which the bush grew may have come from "near the Missouri," and it may have come from some part of the world very remote from the Missouri.

Rosa Sandbergii. Stout, rigid, much branched but low, the branches glabrous, reddened, sparsely armed with short stout slightly curved prickles: leaves small, with rather crowded small leaflets; rachis slender, glabrous, glandless and with no trace of prickles; adnate part of stipules narrow, thin, glabrous, glandless, the lobes dilated, abruptly acuminate, their margins with some few sessile glands; leaflets 5 to 7, thin, obovate, obtuse, sharply serrate, rather pallid and glaucescent as well as wholly glabrous on both faces: flowers mainly solitary at ends of short twigs; calyx glabrous except as to the pubescent margins of the sepals: fruits small, globose, smooth and glabrous, crowned with the persistent small sepals.

Colgate, Dawson Co., Montana, collected in 1892 by Messrs. Sandberg, MacDougal and Heller; their n. 1009 as in U. S. Herb.

A Cruciferous Monotype.

Sandbergia. Perennial herbs, in habit, vegetative characters and stellately hoary indument recalling the Physarieae. Flowers small, white, at first almost corymbose, but passing to long loose racemes in fruit. Leaves simple, chiefly in a basal tuft surmounting the short caudex and its branches. Sepals subequal both at base and throughout, short, broad, obtuse. Corolla regular; petals with broad ligulate claw and broader

spreading limb. Stamens 6, short, nearly equal; filaments stoutly subulate; anthers small, ovate, acute. Ovary linear; stigma depressed and sessile. Siliques linear, straight, narrow, only moderately compressed; valves with strong midnerve; seeds in one row, not strongly flattened, oval-oblong, wingless.

S. WHITEDII. C. V. Piper under *Arabis*. This cruciferous type of the Northwest, seen in flower only would be taken for a member of the genus *Lescuriella*, several whitish-flowered or pinkish species of which are very much like this in all except their pods. But in SANDBERGIA the pods are really linear—even narrowly linear—siliques; but it does not at all follow from this that the plant is an *Arabis*. There are plenty of genera, *Arabis*, *Sisymbrium*, *Erysimum*, *Stenophragma* and many others into which pods like these are easily admissible; while the flowers of the present type are as far from those of any *Arabis* as can be well imagined. I am constrained by its floral characters, together with its completely vesicariaceous habit and indument to propose for it the rank of a genus, and I willingly dedicate it to him who first collected it, Dr. J. A. Sandberg, whose name is already widely known as a collector.

Four New Potentillaceae.

POTENTILLA VALLICOLA. Stout and short branched caudex surmounting a thick subligneous root: stems slightly decumbent, a foot high or more, almost naked above the base, terminating in a rather contracted cyme, both stem and lower face of all leaves silvery-tomentulose, but upper face darker, yet canescent with a very thin coat of short silky hairs: basal leaves about 4 inches long, not depressed, the petiole and leafy rachis about equal as to length; leaflets 7 to 9, closely approximate, 1 to 1¼ inches long, oblong in outline, deeply and incisely serrate, the upper pairs decurrent on the rachis: corolla not seen; mature calyx villous with long white hairs,

its segments triangular-lanceolate, very acute, the bracteoles less than half as long, lanceolate: carpels 8 or 10, small, smooth, dull-green.

Fort Valley, northern Arizona, at 7250 feet altitude, 4 Sept., 1909, H. D. Burrall.

POTENTILLA MOGOLLONICA. Perennial, of the *Leucophyllae* (Rydb.), but of low stature, thinnish texture, the plant in no part whitened with indument: basal leaves barely 4 inches long inclusive of the short petiole, the leaflets 5 to 7, pinnately arranged and approximate, 1 to 1½ inches long, oblong or obovate-oblong, coarsely and rather acutely serrate, the upper pair strongly decurrent, lower face hoary with both a thin close tomentum and some long slender appressed hairs, upper face quite green but with scattered long appressed hairs, this kind more conspicuous at the margins of all leaflets: flowering stems slender, ascending, surpassing the foliage by no more than 1 or 2 inches, the flowers few and on slender pedicels: calyx thinly appressed-villous, deeply cleft, the segments ovate-lanceolate, acute but not strongly so, bracteoles lance-oblong, short: petals of twice the length of the calyx, light-yellow, very retuse but scarcely obcordate; pistils apparently only 5 or 6.

Mogollon Mountains, New Mexico, 25 Aug., 1903, O. B. Metcalfe, distributed for *P. ambigens*, under his n. 594; but the sheet in U. S. Herb. (n. 495585) shows two specimens of the plant here described, and one of the very different thing, *P. propinqua*, Rydb.

POTENTILLA WARDII. Tufted perennial, of the white-leaved group and with white indument: basal leaves many and almost upright, 2 to 4 inches long and the length mainly petiolar, the mostly 7 leaflets crowded upon a rachis of less than ½ inch; leaflets of firm texture, ½ to 1 inch long, closely and not very deeply subfalcately serrate, lower face white-tomentose without silky hairs except on the midvein, this densely clothed with them, upper face silvery-silky but

without trace of real tomentum; peduncles subscapiform, a foot high or less; calyx silky-villous, its segments ovate, acuminate, its bracteoles ovate-lanceolate and less than half as large: petals large, yellow, obcordate: fruit unknown.

Plant collected only by Lester F. Ward, at 11000 feet on Thousand Lake Mountain, Utah, 14 July, 1875. It has passed for *P. Hippiana*, though with totally different foliage and pubescence.

HORKELIA MYRIOPHYLLA. Tufted perennial, with rigid terete stems a foot high and more, yellowish and somewhat lustrous to the unaided eye, but under a lens sparsely glandular-puberulent, the flowers in a rather strict terminal few-flowered cyme: basal leaves linear, 4 to 6 inches long, glandular-puberulent without other hairiness of any kind, very small, crowded on the rachis, the leaf as a whole terete in its early stage, each leaflet divided to the very base into 5 or more unequal divisions; calyx of a short cup-like tube and much longer triangular-lanceolate acuminate segments, the bractlets of less than ¼ the size of the segments and lance-oblong: petals white, oblong-cuneiform, surpassing the calyx-segments and somewhat spreading: stamens 15 or 18, the filaments subulate, alternately long and short: pistils many.

Borders of mountain meadows at 7000 feet in the eastern part of Inyo County, California, collected 12 Aug., 1910, by some one employed in the U. S. Forest Service whose name has not been given. Each leaflet has the appearance of being a fascicle of distinct leaflets.

Three New Labiatae.

KOELLIA FASCICULARIS. Stems stout, strict, 2 feet high, bearing congested inflorescence at summit only, the angles densely villous-hirsutulous: principal leaves lance-linear, rigid, 1½ to 2 inches long, entire, the margins revolute, hardly pubescent except marginally and on the veins beneath,

very conspicuously punctate on both faces, the axils of all bearing short branches not equalling the leaves and densely beset with small linear revolute leaves: flower-clusters small, capitate, their inner bracts margined by a whitish-woolly tomentum, as are also scarcely more than deltoid short calyx-teeth: corolla pinkish, purple-dotted.

Species apparently local on prairies near Chicago; collected by L. F. Ward, 16 Aug., 1897, and by Agnes Chase, 24 July, 1901.

KOELLIA HURONENSIS. Plant nearly a yard high, not stout for the height, the internodes long, axillary sterile branches elongated slender, only sparsely leafy, the whole plant deep-green, to the unaided eye glabrous, a lens showing the angles of the stem pubescent with hirtellous short hairs: main leaves elliptic-lanceolate, subsessile, 2 to 2½ inches long, not revolute, remotely denticulate, thin, glabrous on both faces or with a scanty short pubescence on the midvein and margins, veiny with about 5 pairs of feather veins, rather closely small-punctate: verticillasters in short spikes of 2, 3 or 4 terminating the few uppermost branches, nearly ½ inch in diameter, barely ¼ inch high: calyx hoary with a minute pubescence, the teeth more so, triangular but longer than broad, equal: corolla not seen.

Open prairie-like ground at Cassville, Michigan, on Saginaw Bay, an arm of Lake Huron; type specimens collected by Mr. Charles K. Dodge, 9 Sept., 1910. Its deep-green and glabrous aspect distinguishes it from all other *K. mutica* allies.

KOELLIA CURVIPES. Stems stoutish and rigid, rather acutely angled, 2 feet high, all parts equably tomentellous-puberulent, not even the angles showing other indument, all the foliage pale yellow-green as to the upper face, which is tomentellous like the stem, but lower face white with a denser tomentum, without traces of hairiness even on the veins; main leaves ovate, 1½ inches long, lightly serrate-denticulate,

all turned downwards on rigid curved petioles of ¼ inch, the few small fascicled ones subsessile, widely spreading: floriferous branches few, remote, ascending, each with 1, or at most 2 glomerules, the largest 1 inch broad, ½ inch high: bracts and calyx only more densely tomentose, devoid of hairiness; calyx-teeth slightly unequal, very short, merely deltoid but acute: corolla very short and small, tomentellous externally.

Specimens in U. S. Herb. from higher slopes and summit of Stone Mountain, Georgia, collected by John K. Small, 27 July, 1893. It is remarkable that a type so distinct in aspect and in important characters should have been allowed to pass for *K. albescens*.

Two Californian Columbines.

AQUILEGIA HYPOLASIA. Robust and tall, perhaps a yard high, the stout and somewhat fistulous stems with ascending flowering branches sparsely and somewhat viscidly hirtellous, the long peduncles more densely so: basal leaves 8 to 10 inches high and with large ample leaflets, the petiole and petiolules villous rather than hirtellous; leaflets 1½ to 2 inches long and broad, 3-cleft to the middle, the sinuses narrow, the segments again 3-lobed and the lobes obtuse, upper face of a livid green and wholly glabrous, the lower almost as wholly soft-villous with long spreading very fine hairs, but these most signally developed along the veins and veinlets: flowers scarlet, small for so large a plant, their length little more than an inch, but spread of sepals much more than an inch, these individually narrowly rhombic-ovate, very acute, their claw short and wide; petals subtruncate, very short and thick: follicles pubescent, acute at tip and there moderately divergent.

Indigenous to extreme southern California, in the moun-

tains, the flowering plant collected between Campbell's and Cameron's ranches, 21 June, 1894, by Edgar A. Mearns; the fruiting ones by the same collector between Pine Valley and Laguna, 11 Aug. 1894. Among scarlet columbines of California this one, strongly marked in character, is equally singular phenologically considered; for its flowering appears to take place in the dry season of the year. The 21st of June is the time of the blooming of aestival rather than vernal flowers. *A. truncata*, to which *A. hypolasia* is somewhat related, comes into flower in the coast mountains of even northern California in April.

Aquilegia adiantoides. Slender and tall, 2 feet or more: petioles of lower leaves 4 or 5 inches, 3 primary petiolules 1½ to 2 inches, all these sparsely and delicately villous-hirsute, the short petiolules of individual leaflets quite densely so, the sparse but distinct indument of both faces of leaflets as delicate, but shorter and not spreading; leaflets of thin texture, smallish and rather remote, all deeply ternate-incised and the segments rather deeply crenate-lobed: flowers remote on long suberect peduncles, these shortly and rather stiffly hirtellous, especially so near the flower: sepals and petals scarlet, the former rhomboidal, acuminate, unguiculate, deflexed, almost equalling the short spurs: anthers ellipsoidal: follicles not seen.

Species known only as collected by the late W. H. Brewer, at New Idria, California, 24 July, 1861, his n. 797 as in U. S. Herb., on sheet 320308. It is labelled in Prof. Brewer's hand *A. Canadensis*. As to habit, pubescence, lax, delicate finely cut adiantum-like foliage, as also its distinctly rhombic sepals, it is a thing wholly apart from *A. truncata*, so common in middle California, which flowers in April and May only; this southern one, strangely, in July and August, and that not as a mountain or subalpine plant, but as one belonging to a more arid and heated part of California than *A. truncata* inhabits.

Accessions to Antennaria.

In the vast arid regions of our far Southwest, where also, especially in mountain districts, antennarias abound, there is a group of them the leaves of which appear to be marked by a narrow border of clear white which is in elegant contrast to the usually rather vivid green of the leaf as a whole when viewed from above. This effect, however, is due to the fact that leaves, green above and white beneath, have a narrow margin upturned in such wise as to show a strip of the lower-face whiteness around the green upper face.

Twelve years ago (Pittonia, iii. 290) I published the first member of this group, calling it *A. marginata;* but in the interval other plants from different parts of the desert Southwest, showing white margined leaves, all of which have been labelled *A. marginata*, some of them so named with my concurrence hastily given, it now appears after further examination, must be excluded as distinct from the original of that name.

Antennaria Fendleri. Plant flaccid rather than rigid, the growing stolons 2 to 5 inches long and assurgent, their leaves increasing in size toward the ends and there ultimately forming a rosette, green above, white tomentose beneath, those of full maturity and of the season preceding more than an inch long, the laminar part broadly obovate and very obtuse, passing with little abruptness to the much larger petiolar part, the green upper face showing, or even failing to show a faint white margin of the tomentum clothing the lower face: scapiform flowering stems of the pistillate plant 4 to 8 inches high, beset with 4 to 6 oblong acuminate suberect leaves an inch long, and these not glabrous above: involucres large, subcorymbose, the head as a whole ½ inch high and subcampanulate, the green base of the involucre slightly arachnoid, the numerous white tips of all bracts lacerate-toothed across the summit which in the outer is obtuse, in the inner acutish: staminate plant unknown.

Immature pistillate plants were collected long ago by Fendler in 1847. These as in U. S. Herb. under his 1n. 52[a] were by me too inadvertently cited as forming a part of my *A. marginata*. The description is here drawn from excellent specimens collected by Mr. and Mrs. Heller near or at what must have been the original station of Fendler, near Santa Fe, New Mexico, 29 May, 1897. Heller's number, as in U. S. Herb., is 3612, but on the sheet are but two specimens of *A. Fendleri*, the third being a good example of the very different *A. Holmii*, Greene, which we know only from Colorado.

Antennaria peramoena. Main stems unusually rigid and suffruticose, several arising from a perpendicular and stout central root, all prostrate and apparently rooting at all points; stolon-like new branches not striking root the first year, 3 to 5 inches long, closely leafy and equally so throughout, no rosette being formed at the end: leaves ½ to ¾ inch long, somewhat abruptly spatulate-contracted above the middle, the not well defined obovate apical and laminar part obtuse or abruptly and minutely mucronate-acute, texture unusually thin, upper face vivid-green, puncticulate, sometimes scabrou-lously so, surrounded everywhere by a narrow marginal line of the dense white pannose tomentum investing the lower face: pistillate plant unknown: inflorescence of the staminate on slender scapes only 2 or 3 inches high, very compact, of about 5 heads all sessile, the involucres not strongly lanate, the few bracts with broad and short very obtuse white tips: pappus-bristles, at least the outermost, with strongly flattened and irregulary incised lanceolate acute tips.

An uncommonly beautiful species of matted habit and long closely leafy branches, known only as collected by E. O. Wooton, at Wheeler's Ranch, New Mexico, 11 July, 1906.

This concludes the series of species with white-margined foliage.

Antennaria hygrophila. Plants formed into extensive but not compact mats, the stolons loosely leafy throughout,

the leaves more numerous at the ends but even these upright and not forming a rosette, the longest stolons hardly 3 inches long, slender, depressed, but firm: leaves of uncommonly thin texture, oblanceolate, acute, ¾ to 1½ inches long, greatly narrowed toward the base, equally somewhat hoary on both faces with a thin cottony rather than woolly indument everywhere permanent, flowering stems of pistillate plants 4 to 8 inches high, slender, leafy with suberect leaves less than an inch long, linear, acuminate: heads compactly subcorymbose; involucres of middle size, white-woolly as to the short herbaceous part of the bracts, but showing a very dark spot just at base of the long obtuse white tips, these in few series and little imbricated.

Collected at Marlette Lake, Washoe Co., Nevada, 10 July, 1902, by C. F. Baker, and distributed by him under the above name, and his n. 1296. Species seeming intermediate between my *A. media* and *A. parvifolia.*

Antennaria pyramidata. Stems tufted on a short stout ligneous caudex and 5 to 7 inches high, very notably leafy, the lowest cauline leaves crowded and as large as the basal, diminishing only very gradually toward the inflorescence, these and the stem densely white-tomentose with a very close coat, oblanceolate, cuspidately acute, of firm texture: inflorescence not peduncled, forming a pyramidal thyrsus rather than corymb or panicle; heads small, those of the pistillate plant subturbinate, of the staminate campanulate, the bracts of both numerous, much imbricated, all obtuse, or the inner series in the pistillate abruptly acutish, none woolly at base; bristles of pappus in male plant filiform to near the summit, then abruptly dilated.

Collected somewhere in the mountains of California, at 5000 feet, 18 June, 1897, by Marcus E. Jones, and distributed for *A. argentea;* but the plant is (1) of less than half the size of that species, (2) arises tuftedly from a caudex that is woody, (3) is strongly leafy with a firm white (not silvery) foliage (4) of another outline, and (5) its infloresence is

pyramidal (not flat-topped). The specimens are on sheet 358998, U. S. Herb. The sheet may or may not be the same cited once by Mr. E. Nelson (Bot. Gaz. xxxiv. 124) under the name of *A. argentea*, var. *aberrans*. That author, however, saw nothing but what he called a "racemosely paniculate inflorescence" to distinguish between what he had and the typical *A. argentea*. Also he reports that the sheet he saw had "only pistillate plants." The sheet from which I describe *A. pyramidata* holds six specimens, of which two are plainly staminate, their involucres and flowers differing from those of the pistillate as I have indicated.

Some new types of broad-leaved species of the Atlantic slope of the Continent are next subjoined.

ANTENNARIA ARKANSANA. Broad-leaved and with the herbage of *A. fallax* nearly, but the plant smaller: basal leaves well enduring the winter, 3 inches long, including the petiole, the blade oval-elliptic, mucronate, 1¼ inches wide, 3-veined, green and glabrous above, though when young very thinly and inconspicuously silky-hairy: stems of fertile plant 6 to 10 inches high, ending in a rather close cluster of 4 to 7 heads; involucres campanulate, scarcely woolly at base, the scales in no part obscured, oblong-linear, numerous but only slightly unequal, the scarious tips of the very outermost short and acute or hardly obtuse, of all the others narrow and acute or acuminate: stems of sterile plant low, heads few; bristles of pappus in this narrowly linear, with few and scattered serrate teeth.

In woods near Fulton, in extreme southwestern Arkansas, B. F. Bush, 4 and 5 April, 1900; the plant said to be a denizen of woodlands; distributed by Mr. Bush as *A. occidentalis*. The leaves are greener than in that species, which by both the involucres of the fertile plant, and the pappus of the sterile, this is very distinct from that.

ANTENNARIA ELLIPTICA. Plant of the large-leaved group,

the stems rather low, that of the fertile 7 or 8 inches, of the sterile 3 to 5 inches, the inflorescences of both corymbose and of only about 5 heads : leaves in age subcoriaceous, 3-nerved, the indument almost wholly deciduous from the upper face, the blade longer than the petiole, oval-elliptic, acute, 2 inches long, 1⅛ broad : involucres in the fertile campanulate rather densely arachnoid at base, the white tips of the scales not at all conspicuous, short and ovate in the outer series, narrow and very acute in the others : pappus-bristles in male with short broad and obtuse tips lightly crenate.

On hill tops, forming small mats, at Mountain Glen in extreme southern Illinois, collected by Professor Carl F. Baker, 21 April, 1900 ; distributed by him, if at all, under the name of *A. occidentalis ;* but even the female plant has not the involucre of that species, and male pappus is very characteristic.

Antennaria bifrons. Mature leaves of firm texture, 1¼ to 2¼ inches long, obovate-cuneiform, therefore without proper petiole, deep-green and glabrate or nearly so above, beneath closely tomentose, but young foliage even when full grown quite hoary above ; stolons very short, with few leaves : stems of fertile plants slender, erect, 7 to 11 inches high, its bracts oblong-linear, acute, about four only and remote : heads large, short-pedicelled and subcorymbosely glomerate ; involucres well imbricated, the scales at base very distinctly arachnoid-hoary rather than woolly, the white tips of none equal to the herbaceous part, all acute : male plant not known.

This is a very singular species, the type specimens of which were collected by myself in an old pasture in sandy soil, near Port Huron, Michigan, 9 June, 1909. By the form of its foliage it should be an ally of *A. neglecta*, yet by the size and especially the width of the same leaves, and by the short stolons and long stems it looks like the other group.

Antennaria pinetorum. Of the large-leaved group, the foliage rather copious but not large, apparently not well endur-

ing the winter, those of the season apparently full grown at flowering time, about ¾ to 1¾ inches long including the narrow and well defined petiole, the blades nearly orbicular, ½ to ¾ inch in diameter, the length scarcely greater than the width, all very obtuse, thin, beneath obviously 3-veined under the dense indument, the upper face very closely but finely arachnoid-tomentose, the coat never completely deciduous: flowering stems very slender, but rather notably bracted with oblong and oblong-linear spreading bracts, the fertile 10 inches high and subcorymbose, the heads 8 or 10; scales numerous but too nearly equal to appear well imbricated, not woolly at base, greenish almost throughout, the obtuse scarious tips both short and of too greenish-white a hue to be at all conspicuous; flowering stems of male plants barely 3 inches high, their few heads subsessile, their scales with also greenish white and obscure tips; bristles of their pappus with little dilated and only indistinctly serrated acute tips.

Pine woods near Portsmouth, southern Virginia, 27 April, 1898, collected by Mr. Thos. H. Kearney; type in U. S. Herb., sheet 355635. A very well marked member of the group of species which make very little show of scarious tips to the involucral scales.

ANTENNARIA DILATATA. Plant large but of low stature, the flowering stems 3 to 6 inches high, the sterile equalling the fertile: basal leaves of the former season copious, surviving the winter in perfect condition, very large for the plant, all long-petioled, the blades suborbicular, 1 to 1¼ inches wide, the length the same, or rarely a mere trifle greater, the lower face permanently close-tomentose, the upper after maturity sometimes almost perfectly glabrate, more commonly whitish-spotted with small knots of the not further deciduous loose tomentum: heads in the fertile plant only 3 to 5, closely glomerate and appearing sessile; involucres smallish, broadly turbinate, the scales well imbricated, all with short but wide and rather blunt white tips: involucres in sterile plant twice as numerous, 7 to 11, also not sessile, the tips of their scales

oval, not more obtuse than those of the fertile; pappus-bristles of the sterile flowers with acutely lanceolate and finely serrated flattened tips.

Type specimens gathered by the writer in thin woods among rocks near the summit of Maryland Heights, Maryland, overlooking Harper's Ferry, 10 May, 1908, the plant not otherwise known.

Antennaria Oneidica. Slender and delicate for one of the broad-leaved group, the stolons very short, with foliage fully developed at flowering of the plant: leaves 1 to 2 inches long inclusive of the conspicuous narrow petiole; the blades round-oval and round-obovate, very obtuse, thin, veinless or nearly so, white beneath, thinly and shortly silky above and rather permanently so: flowering stems of pistillate plant 7 to 9 inches high, very slender and with small spreading bracts; heads small, in a terminal corymb of 5 to 7; involucres campanulate, the scales all narrow and acuminate, very numerous and much imbricated, none but the innermost showing slender white tips, the outer with hardly a trace of them: staminate plant not known.

Near Whitestown, Oneida Co., N. Y., by Dr. J. V. Haberer, 4 June, 1904, who reported it as growing on the border of a piece of sandy woodland. No other species is known to me of which the involucral scales are so narrow, and so almost wholly green; though the large *A. mesochora* of the prairie country makes a near approach to this in that particular.

The succeeding are subalpine, and of the Pacific Coast:

Antennaria pulchella. Rigidly suffrutescent, depressed, forming a loose mat, the surculi short, very leafy at the ends; leaves less than ½ inch long, obovate-spatulate, obtuse or even retuse, more commonly acutish, of coriaceous texture and permanently white-tomentose on both faces: flowering stems very slender but hard and wiry, their few bracts small

and appressed; heads several, glomerate at summit of stem; involucres only scantily woolly, the tips of the scales in the fertile plant narrowly oblong, or oblong lanceolate, of a deep dark green: tips of pappus-bristles in sterile plant lanceolate, acute, short and rather broad, subentire, or with here and there a large tooth.

Collected at 11000 feet on Mt. Goddard of the Sierra Nevada of California, July, 1900, by Messrs. Hall & Chandler; their n. 686 as in U. S. Herb.; also what appears to be the same was obtained by J. G. Lemmon, at some uncertain station in the Sierra as early as 1875, his specimens all sterile, as are also nearly all those of Hall & Chandler. On the other hand, a sheet of seven specimens gathered in the high mountains of Placer Co., by Mr. C. F. Sonne in 1892, and which no doubt are of this species, shows only the female plant, yet these specimens seem less shrubby than the typical *A. pulchella*, and may perchance belong to the more northerly and more herbaceous plant which I meant for typical *A. media.*

ANTENNARIA SCABRA. Low and densely matted, also very leafy as to the many and short stolons, these barely surpassed by the flowering stems, the whole barely an inch high: leaves obovate-cuneiform, ½ inch long, at first with a dense soft white-woolly coat, this promptly deciduous, exposing a dense glandular-scabrous green indument: heads several, glomerate at summit of the very short stem; only the scarious part of involucral scales obvious, this oval, obtuse, of a dull greenish-white: sterile plant not known.

Alpine on summits of the White Mountains, Mono Co., California, at 12500 feet, collected by W. H. Shockley, July, 1886; type in U. S. Herb.; the collector's n. 444. Remarkable for the strong scabrous indument underlying the more or less transient-tomentum. Perhaps to this may be referred a plant from Farwell Gap, by Coville & Funston, n. 2160, the herbage of which soon becomes green by the shedding of the wool; but the traces of scabrous indument are faint.

ANTENNARIA DENSA. Plant forming mats, the whole rising little more or less than an inch above ground; stolons reduced in the main to sessile fascicles of small leaves crowded upon the short stout branches of the subligneous caudex; leaves hardly ¼ inch long, obovate, rather loosely and softly white-woolly on both faces; those of the short flowering stems oblong, almost imbricate-crowded: heads of fertile plant 1 to 4, sessile; the short-herbaceous part of involucral scales concealed by wool, the ample tips of a dark olive-green or almost blackish, those of the outer series rather obtuse, all the others acutish: sterile plant not known.

Alpine on Mt. San Gorgonio of the San Bernardino Range, southern California, at 11000 feet, collected and distributed by Le Roy Abrams and E. H. McGregor, 12 July, 1908. It was sent out for *A. media*, but its nearest ally is perhaps *A. pulvinata* of the frigid steppes of a thousand miles northwestward.

ANTENNARIA CANDIDA. Densely matted but not as low as *A. densa*, the numerous very leafy surculi upright and their leaves not rosulate but suberect, ½ inch long more or less, obovate-spatulate, clothed densely with close snowy-white tomentum: flowering stems rising 1 to 2 inches above the cushion of leafy surculi, slender and with their small leaves as white-woolly as other parts: heads in fertile plant 3 to 5, closely congested; proper scales of involucre wholly concealed by the white indument, their translucent tips from oval and obtuse in the outermost to oblong, and in the innermost to lanceolate and acute or acuminate: sterile plant not known.

Detected at 9000 feet on Mt. Rainer, Washington, by Mr. O. D. Allen, 14 Aug., 1895, and distributed to U. S. Herb. under n. 141. At variance with everything else that has been called *A. media* by its peculiarly congested habit, upright firm foliage, and the shining whiteness of the indument investing all parts except the dark tips of the involucral bracts. Its next of kin is *A. pulvinata*.

Miscellaneous Specific Types.—IV.

LUPINUS HIRSUTULUS. Rather large annual, the branches stout, strongly decumbent or merely assurgent, nearly a foot long, whitish and almost polished underneath a double indument, namely, of long and sparse pilose hairs, and a short less sparse villous pubescence: stipules long, subulate-filiform; petioles much longer than the leaves, slender, strongly hirsute; leaflets 5 to 7, small, though obovate-cuneiform, very obtuse, rather strongly hirsute: racemes very short-peduncled and short, of only about four verticils these rather crowded: calyx short, densely silky-villous; corolla apparently light-purple, little more than ¼ inch long; pods linear, 1 inch long densely and softly villous, 5 to 7 seeded: seeds small, dull-whitish.

Beacon Hill, Vancouver Island, 15 June, 1908, Prof. John Macoun. A new and very distinct member of the group of small-flowered annual lupines; the plant itself large as the largest of them, but much depressed.

EUTHAMIA GALETORUM. Stems slender, erect, 2 feet high, simple, parted at summit into a narrow corymbose inflorescence of few heads; the whole plant glabrous, the punctation obscure, all the parts flexible and with a suggestion of succulency or fleshiness: leaves of a shining green when fresh, linear, acute: involucres broadly turbinate, as broad at summit as high; outer bracts green, ovate-lanceolate, obtuse, the inner oblong, only greenish at tip, all obtusish, their margins faintly scaberulous under a lens: rays rather many, oblong-oval, deep yellow, disk-flowers numerous; achenes strigulose.

In very wet ground on the very margin of Lake Pleasant, near Springfield, Nova Scotia, collected by the writer 8 August, 1910. A bog plant was unexpected in this genus, for the greater proportion of the species are of rather dry habitat. This one was found growing among sundews and bog violets, bordering thickets of sweet gale.

RUDBECKIA UMBROSA. Stem stout, striate, glabrous, all upper part of the plant very leafy and the leaves ample as well as extremely thin; the lowest parted into 3 leaflets with hirsute petiolules, the length and breadth of the leaf as a whole about 10 inches, the terminal leaflet deeply 3-cleft, the laterals entire or bifid, the margins of all coarsely but not deeply serrate-toothed, neither face rough, but both faces thinly and minutely strigulose; upper leaves reduced, variously 3-lobed, none undivided; heads few and short-peduncled: also not large, the disk globose, the rays few and small: pappus of disk-achenes of about 4 nearly distinct teeth.

Oak Creek, Arizona, 8 Aug., 1909, by A. Pearson. Evidently a plant of dense shades; the leaves so thin and membranaceous as to be in strong contrast to those of other allies of *R. laciniata*.

DASYSTEPHANA OXYLOBA. Stems tufted and at base decumbent, stoutish and rigid, ½ to 1 foot high, the whole plant glabrous to the unaided eye, but appearing faintly puberulent under a lens, or else not at all so: basal leaves crowded on the stem and oval, only ½ to ¾ inch long and very obtuse, those midway of the stem more remote, oblong-lanceolate, acutish; from 3 to 6 of the upper axils floriferous, the flowers subsessile, the whole forming a longer or shorter spike: calyx ¾ inch long, the tube much shorter than the teeth or segments, these lanceolate or oblong-lanceolate and quite foliaceous: corolla purple, 1¼ to 1½ inches long, never expanding, always of a somewhat elliptic outline, the lobes narrow, long, very acute, of twice the length of the intervening folds, these bifid or more than once cleft.

A handsome closed gentian, sent in from the mountains of northern Arizona, as collected 9 Sept., 1909, by some one employed in the Forest Service near Flagstaff, the special locality "Wet Park" is named, said to have an altitude of 7250 feet.

LEAFLETS, Vol. II, pp. 153–164. 18 November, 1911.

VIGUIERA CHENOPODINA. Shrubby with rigid branches tomentulose-puberulent when young: leaves about an inch long, short-petioled, deltoid-ovate, very obtuse, entire, very firm, only obscurely veiny, cinereous-tomentulose on both faces: heads in a nearly naked subcorymbose panicle, or few and quite corymbose: involucres ½ inch high, not strongly imbricated, the few outer bracts oval-oblong and more or less hoary, the inner glabrous, twice as long, linear-oblong, all obtuse: rays few, rather broad and showy: achenes immature, biaristate or uniaristate, the intervening scales large, lacerate-fimbriate at summit.

Between Santo Domingo and Matancita, Lower California, 14 Nov., 1905, collected by E. W. Nelson and E. A. Goldman, their No. 7277 as in U. S. Herb. Well marked by the small entire obtuse chenopodiaceous foliage.

POROPHYLLUM JUNCIFORME. Tall shrub with few long erect reedy and monocephalous branches, these pale and glaucous, stoutish and almost fluted rather than striate, the leaves few, linear: heads ¾ inch high, subcylindric; bracts of involucre about 5, slightly dilated upwards, at summit obtuse, superficially pale, the 3 or 4 pairs of oblong glandular spots very conspicuous: achenes densely strigose-hispidulous.

Mescal Mountains, Arizona, 24 May, 1890, M. E. Jones. Remarkably distinct from *P. gracile* by its tall naked rigid and not slender monocephalous branches.

POROPHYLLUM VASEYI. Wholly herbaceous, the low reedy stems closely tufted, very glaucous and striate, 5 to 7 inches high, parted at summit into 2 or 3 short monocephalous branches; leaves few, linear, short, scattered: heads hardly ¾ inch high; involucre short, little exceeding half the length of the flowers, very many-flowered and verging towards the turbinate or subcampanulate, the 4 or 5 bracts oblong-linear, very obtuse, pale, marked with about two pairs of long narrowly linear glandular spots: achenes stiffly hirsute.

Plant known only as collected at Mountain Springs, above the Colorado Desert, San Diego Co., Calif., by G. R. Vasey, 1880.

Porophyllum caesium. Suffrutescent, tall, freely branched above: leaves linear, short, spreading or recurved; heads ¾ inch high, nearly cylindric; bracts of involucre very firm, even almost coriaceous, dark-colored underneath a dense coat of bloom, glandular spots commonly wanting, when present elliptic in 1 or 2 pairs and deeply sunken: achenes chestnut-brown, strigose-hispid, crowned with a fuscous pappus shorter than itself.

Cajon Hills, southern California, 1 May, 1891, collected by Geo. W. Dunn; type in U. S. Herb.

Porophyllum leucospermum. Nearly or quite herbaceous, densely and fastigiately branched from the base, a foot high, leaves short, almost filiform: heads subcylindric, nearly an inch high, the corollas and pappus exserted from the involucre for nearly their whole length; bracts pinkish underneath the ordinary light coating of bloom, most of them marked by 2 pairs of elliptic gland-dots: achenes long, slightly beaked, pale straw-color or nearly white, thinly hispidulous, crowned by a long pale pappus.

Specimens from Vegas Valley, Lincoln Co., Nevada, collected by Coville and Funston on the Death Valley Exped. 9 March, 1891. Well distinguished by its long heads and pale achenes and pappus.

Porophyllum confertum. Suffrutescent and tall, the flowering branches with narrowly linear spreading foliage and ending in compactly corymbose clusters of narrow and few-flowered heads: heads about ½ inch high, 5-flowered; bracts of involucre linear, greenish and nearly without bloom, marked with 4 to 6 narrowly oblong gland-dots: achenes narrowly cylindric, thinly scaberulous.

Ceralvo Island, Gulf of California, 12 Febr. 1906, E. W. Nelson and E. A. Goldman. Type in U. S. Herb.

SENECIO GOLDMANII. Apparently a tufted perennial, the simple and very erect stems equably leafy, 2 feet high, rather amply corymbose at summit: leaves simply pinnate into very long and not numerous filiform segments, sessile and ascending, rather fleshy, glabrous: involucres less than ½ inch high, broad and subcampanulate, the bracts linear, abruptly and shortly acuminate but hardly acute, glabrous but apparently dotted sparsely with minute pellucid glands: rays short, oblong, yellow.

Rosarito, Lower California, 25 Sept., 1905, collected by E. W. Nelson and E. A. Goldman, their No. 7165 as in U. S. Herb.

FRANSERIA CARDUACEA. Stout and probably a tall shrub, the flowering branches clothed with ample foliage; stems, peduncles, also the midvein of the leaf whitened with a thin soft tomentum, the herbage otherwise hoary with a dense harsh whitish muricate-scabrous indument; leaves ample, subsessile, 6 inches long or more, laciniately pinnatifid into about 2 or 3 pairs of lobes, all acuminate and coarsely and unevenly toothed, texture very firm: inflorescence terminal and panicled, the pistillate involucres rather many, closely beneath the quite short and broad staminate racemes: fruit immature, but soft-pubescent throughout and with few rather soft curved or hooked spines.

Lower California, collected at Aquaje de Santana, 35 miles north of San Ignacio, 4 Oct., 1905, by E. W. Nelson and E. A. Goldman. Allied to *F. arborescens*, Brandg., but with different indument, the foliage very broad and repeatedly gashed, with the general cut of that of some coarse thistles.

SCHMALTZIA RIBIFOLIA. Shrub stout and rigid, the stems apparently erect, with short branches nearly divaricate, their bark after the first year ashy gray, glabrous, that of young

and still leafy branches red-brown, rather obscurely puberulent: leaves all simple and undivided, suborbicular but perceptibly broader toward the base, here subtruncate to subcordate, commonly with 3 obscure rounded lobes very obtuse, these lightly and coarsely crenate, diameter of leaf about 1 inch each way, texture uncommonly firm, both faces about equally green, glabrous: fruits solitary, or rarely two to the spike, very large, glandular scaberulous.

Collected at 3800 feet, at San Mattias Pass, in the San Pedro Martir Mountains, 28 June, 1905, by E. A. Goldman. A fine addition to that group of the genus which has undivided leaves, these in this species having the cut of those of some gooseberry bushes.

SPIRAEA SIMPLEX. Akin to *S. salicifolia*, but low, simple, scarcely more than a foot high, often only 6 inches, almost or quite herbaceous, densely leafy from the base up to the solitary sessile thyrsoid inflorescence with a narrow strongly ascending foliage; bark of a light red-brown, neither altogether glabrous, nor yet more than obscurely puberulent: leaves about 1½ inches long, lance-oblong and lance-elliptic, acute, closely, evenly and not deeply serrate, the serratures under a lens strongly callous-tipped, lower face and margins not quite glabrous: inflorescence subpyramidally thyrsiform, its branches also the pedicels and calyx somewhat pubescent; flowers small, white; teeth of calyx deltoid, acutish, erect, about equalling the tube: follicles short, thick, glabrous, dull rather than polished.

Plant first known to me from the prairie regions of Canada west of the Great Lakes, where it was collected by Prof. John Macoun, first at Indian Head, Assiniboia, in 1895, then at Brandon, Manitoba, in 1896. I chanced on specimens last summer in my herbarium, duplicates of Professor Macoun's two collectings of this marked species. Thereupon I wrote to my zealous friend Dr. Lunell of Leeds, North Dakota, whose region is not far removed from the Canadian high prairies, to ask if perchance he had met with such a *Spiraea*.

I was promptly favored with two sheets of specimens of the same new species, collected by Dr. Lunell himself at different stations in northern North Dakota; one of them from Butte, 24 July, 1910, the other sheet from low ground near Leeds, in 1904.

The Butte specimens are like those from the Canadian side of the boundary in that they are technically herbaceous. However hard, wiry and wood-like they are as to texture, the whole comes up from under the ground, flowers, fruits as an herb does, and then dies down. The specimens from Prof. Macoun are so gathered as to demonstrate this less clearly. One of the Leeds specimens has two flowering branches arising from a point three inches above the ground, proving that in that place the plant may be partly suffrutescent. The foliage, flowers and fruits of this are more like those of genuine Old World *S. salicifolia* than anything else that has been found on this continent.

ARABIS INAMOENA. Loosely tufted perennial 8 to 12 inches high, the sublignescent basal branches not stout, naked, spreading or ascending: leafy and floriferous stems upright, sparsely leafy, branched and loosely floriferous from below the middle: leaves all very thin, large for the plant, green, thinly pubescent with short dendritic hairs, the basal 1 inch long or more including the long slender petiole, the limb oval, entire or with few teeth, cauline oval to oblong, 2 inches long, obtuse or acutish, short-petiolate or else cuneately tapering to the base, not auricled: flowers small, sepals equal obtuse, dendritic-hairy, petals not greatly surpassing them, erect, of a dull greenish white: pods thin, flat, glabrous, 2 inches long or more, flat, acute, subfalcately curved or nearly straight: seeds in one row and rather remote, suborbicular, broadly winged.

Collected in Inyo Co., California, at Lake Sabrina, in July, 1911, by Dr. A. Davidson, his n. 2729. The plant is akin to *A. repanda* inhabiting mountain districts at low elevations

bordering the Mohave Desert, but is a smaller plant, and has abundant characters.

ARABIS DAVIDSONII. Low perennial inhabiting moist rocks, the short naked and scapiform flowering stems arising each from the branch of a short compactly leafy caudex: leaves oblanceolate-cuneate, 1 to 1½ inches long, very narrow below the middle, at apex acutish and there rarely with a sharp tooth or two, commonly quite entire, of a light green and wholly glabrous like every other part of the plant: flowers unknown: pods about 1½ inches long, few in the raceme and on somewhat spreading pedicels of ½ inch or more; seeds subquadrate or more rounded, wingless, forming a single row in the narrow subfalcate pod.

Bishop's Creek, Inyo Co., Calif., July, 1911, Dr. A. Davidson; his n. 2728. These two new ones represent extremely different types of so-called *Arabis*.

The Genus Saviniona.

The genus *Lavatera*, to which certain botanists averse to using their powers of discrimination have reduced *Saviniona*, was established on malvaceous herbs much resembling *Malva*, but differing from them as to the outer involucel subtending the proper calyx. In *Malva* this is of two or three small bracts that are deciduous. In *Lavatera* the involucel is a firm persistent disk or shallow cup, but more or less deeply three-cleft. Habitally the lavatera species of Continental Europe are widely at variance among themselves, so widely that the several genera that have been proposed will ultimately be accepted, no doubt; for the time seems passing during which men looked to nothing but calyx, corolla and seeds for marks by which to delimit genera. Botanists of the future will give more consideration to the plant as a whole.

But the genus SAVINIONA, the species of which are all insular, and are trees and shrubs rather than herbs, is supported well in the rank of a genus. The first species of this group to be discovered is endemic in the Canary Islands; and it is a very strange thing to record, that the eight other species known belong to islands lying not so very far off the coasts of California and Mexico.

I subjoin the original characterization of SAVINIONA, for the work on Canary Island botany in which it was published is rarely available to students of West American botany.

"**Saviniona** Nob.

Pedunculi axillares, solitarii, elongati, erectopatentes, sub flore articulati, incrassati, ante anthesin ad articulationem deflexi, per anthesin horizontales. *Calyx* duplex, exterior 3 rarius 4-phyllus, foliolis ad basin inter se coalitis, persistens, aut serius caducus, interior subcampanulatus, aut hypocrateriformis, 5-fidus, rarius 6-fidus. *Corolla* subringens, petalis obcordato-bilobis, basi rectis, limbo reflexo, 2 superioribus conniventibus, erectis, infimo labiiformi. *Androecium* corolla dimidium brevius, deflexum. *Cocca* rotundato-cochleata, margine acuta, maturitate indehiscentia, integra, nec ad juncturam cum columella disrupta. *Columella* conico-pyramidata. *Semina* cochleato-orbicularia.

Arbuscula lignosa, ramis elongatis, diffusis, foliis palmato-lobatis, petiolis elongatis, bibracteatis, bracteclis minimis caducis."[1]

S. CLEMENTINA. Small tree with trunk a foot in diameter, and of the height of 12 feet: leaves on petioles 4 to 6 inches long, the blades about 3 inches long, 5-lobed after the manner of maple leaves, nearly truncate at base, glabrous on both faces: corollas of the usual size, of the purple of those of *Malva silvestris* nearly, but paler above the middle: involucre

[1] Webb and Berthelot, Hist. Nat. des Isles Canaries, Vol. 3, pt. 2, Sect. 1, p. 30.

parted nearly to the base into 3 subtrigonous obtuse segments, this and the calyx sparsely and minutely stellate-pubescent; mature calyx cleft to about the middle, the somewhat enlarged segments broadly triangular, reticulate-veiny and hirtellous: pedicels under the flower spreading horizontally, under the fruit firmly upright, straight at all stages, jointed ½ inch below the fruit.

Known only from a single tree on San Clemente Island, California, whence specimens were taken in June, 1903, by Blanche Trask. This and the next, from an adjacent island, differ from all other species in that the peduncles are firm and straight. The color of the corolla in this one is peculiar among the species of *Saviniona*.

S. RETICULATA. Shrub 4 high, with stem 4 inches thick: maple-like foliage 3 inches long, 3½ in breadth in the middle, the base with broad open sinus, the lobes with coarse obtuse teeth; petiole not longer than the blades and stout: corolla of usual size, clear white, the petals neither obcordate nor emarginate, only retuse: pedicels short and straight, only 1 inch long, jointed ¼ inch below the flower; involucre with oval obtuse segments; fruiting calyx an inch high, its segments ovate, hardly acute, strongly favose-reticulate and rough with a not very dense stellate pubescence.

Type specimens collected on Santa Catalina Island, California, in both flower and fruit in Febr., 1898, by Blanche Trask, erroneously distributed for *S. assurgentiflora*, to which it is not intimately related, being of the blue-purple-flowered group. Apparently only a solitary plant was known to Mrs. Trask.

S. DENDROIDEA. In form a perfect tree, only 10 or 12 feet high, but with distinct thick trunk and no branches below the middle: leaves very ample, the largest 9 inches long, of the same width, but on old flowering branches of less than half that size, not deeply lobed, the cleft seldom reaching to the middle of the blade, the 3 terminal lobes far exceeding

the two basal, the basal sinus broadly V-shaped: lobes of the involucre broadly ovate, very obtuse, those of the calyx also short, triangular, acute, these dotted with prominent stellate-hairy tufts rising out of the fine and short stellate tomentum: corollas deep rose-purple, abruptly reflexed from the base or near it soon after first expansion: carpels large, forming a whorl more than ½ inch across, of a dull straw-color or brownish, each carpel wing-angled on both sides, the sides striate from point of juncture with the axis outward to near the margin.

This fine species is known only as collected by myself on the island of San Miguel, California, twenty-five years since. My observations on the plant at the time found record in the first volume of Pittonia (vol. i, p. 77), where I reluctantly referred it to *Lavatera assurgentiflora* Kell. In the course of the first real examination of the fruits of these things, I discover unexpected specific characters calling for a segregation of the material that has passed for *L. assurgentiflora*, and this is the first of the segregates.

S. SUSPENSA. Branches more slender, and both foliage and flowers notably smaller than in other species: largest leaves 2½ inches long, but 3 in breadth, not very unequally 5-lobed to the middle, the lobes unequally and coarsely short-toothed, puberulent along the veins, otherwise glabrous, petioles slender, 3½ inches long: flower 1½ inches long, corolla of the same width at the orifice, the petals apparently never reflexed, deep pink, or perhaps rose-red, the whole flower pendulous on a pedicel nearly 2 inches long, though abruptly turned upwards from the point of the articulation: segments of involucre subtrigonous-oval, obtuse; teeth of calyx of less than one-third the length of the tube, acutely triangular at flowering, in the fruiting state grown to thrice their former size, obtuse, erect over the fruit, or nearly so, or slightly spreading away from it; fruit less than ½ inch wide, the carpels smooth on the back, rather obtusely angled at the

edges, the sides marked by radiating striae which extend nearly to the margin.

Totally distinct from the *S. assurgentiflora* of the San Francisco region by the excellent characters pointed out, the plant is known to me only by an excellent sheet in U. S. Herb., collected at San Diego, Calif., in 1889, by Dr. Geo. Vasey. The small leaves have an abrupt open rather U-shaped sinus.

S. ASSURGENTIFLORA, what I take to be the species so named by Dr. Kellogg under *Lavatera*, was based on a plant of the vicinity of San Francisco. I have at hand no fruiting specimens at all from that region; but what appears to be the same is before me in good fruit from Los Angeles, collected by Dr. Hasse in 1892. Its carpels make a fruit nearly as large as that of San Miguel *S. dendroidea*, but the character of the individual carpel is very characteristically different. Its exterior is both smooth and glabrous, its sides divided into two distinct parts, an axial depression which is white and strongly radiate-striate, this being bounded by an elevated almost semicircular corky or cartilaginous smooth and yellowish part. There is also a very similar plant, with the same well marked carpel, before me from Tia Juana River, Lower California, collected by Dr. Mearns in 1894.

The origin of these different things which have been referred all to one species is a problem awaiting some future generation of Californian botanists who, instead of closing their eyes to differences, and dogmatically proclaiming that things are all one, shall have the will and the energy to betake themselves to the field and honestly investigate.

The following insular species, whose validity no botanist has questioned, are

S. INSULARIS. Watson, under *Lavatera*.
S. VENOSA. " " "
S. OCCIDENTALIS. " " "

Accessions to Apocynum.

APOCYNUM CORDIGERUM. Stem low for one of the *A. cannabinum* group, hardly 2 feet high, very robust, densely leafy throughout with an ample firm yellow-green glabrous foliage, the inflorescences small, dense, none rising above the height of the foliage, all terminal: middle stem leaves oval, 2½ inches long, 1½ in width, very obtuse, closely sessile by a deeply cordate-clasping base: flowers small, green: fruit not known.

Plant said to be common in South Dakota, near Brookings, whence specimens by Thos. A. Williams were obtained, and are in U. S. Herb.

APOCYNUM INCANUM. Leaves elongated-ovate, very acute, short-petiolate, grayish above and much whitened beneath with a fine short tomentum; flowering branches all near the summit, densely cymose, collectively forming an almost flat-topped compound corymbose inflorescence: sepals lanceolate, acuminate, tomentulose like the pedicels and bractlets: corollas small, erect, with short-cylindric tube and abruptly spreading limb, the lobes narrow, acute, the whole flesh-colored: fruit unknown.

Almost silky-hoary species, known only from southern Oregon, as collected at Bolt, Jackson Co., July, 1892, by E. W. Hammond.

The species appears to be of that group, somewhat intermediate between the *Cannabina* and the *Androsaemifolia* to which *A. medium* of the East and several others belong.

The specimens are too fragmentary, consisting of the tops only of the stems; but there is no doubt that they represent a species until now unknown.

Apocynum missiouriense. Plant evidently tall and large as *A. cannabinum*, in habit, inflorescence and flowers widely different; main stem not known, the flowering branches exceeding a foot in length and simple up to the many-flowered and subcorymbose inflorescence; rameal leaves many, short-petioled, ascending, in outline exactly elliptical, ending in a short-subulate mucro, the length 2½ inches, the breadth near the middle less than 1 inch; proper cauline leaves thrice the size of the rameal and of quite another pattern, being broadly lance-oblong with cordate base, and 5 inches long by 1¾ inch width toward the base, all of the usual vivid-green above, though with light-colored veins, and beneath only paler, not definitely glaucous: flowers small and very numerous, mainly disposed in a broad terminal compound cyme, 2 or 3 short branches each with a small cyme surpassing the terminal large one in height; sepals triangular-lanceolate, acuminate, equalling the short-cylindric corolla-tube; corolla small, either white or flesh-tinted, its lobes short, ovate or oval, obtuse, little spreading.

From western Missouri, at Atherton, collected by B. F. Bush, 27 June, 1909, and by him distributed for *A. album*, to which it is far from bearing any close resemblance, being many times larger, and in habit, inflorescence, and even foliage widely different; yet Mr. Bush could not, as it seems, refer his plant to *A. cannabinum*, and it is indeed still farther removed from that than from *A. album*.

Apocynum estellinum. Firmly erect and strict, glabrous, the stem glaucous, the foliage light-green, glaucescent, erect or ascending on both stem and sterile branches, the lower cauline oblong, obtuse, sessile, commonly only 1 inch long, those of the branches rather larger, oblong-elliptic, acute, the veins not prominent: flowers very small, in small clusters below the foliage; sepals ovate-lanceolate, acuminate, equalling the tube of the corolla, this very small, subcylindric, white: follicles about 2½ inches long.

Leaflets, Vol. II, pp. 165–196. 13 March, 1912.

A rather small, and small-leaved Texan species, only one to two feet high, therefore of the size of *A. album*, but singularly upright and strict, and therein most unlike that, which is lax and spreading. The best specimens were collected by Reverchon, at Estelline, on the North Fork of the Red River, Texas, in May and July, 1904, and distributed by B. F. Bush. A good specimen of the same was collected at Canadian, in the same general region, by Arthur H. Howell, in July, 1903.

Apocynum isophyllum. Allied to *A. cannabinum* and as bushily branched, the branches even longer, the whole herbage of a peculiarly intense green, but not dark, glabrous, only the lower face of foliage glaucescent; branches suberect, long, very leafy and the leaves small, suberect, about 1¼ or 1½ inches long, the lowest not larger than the uppermost and all of one size, oblong-oval, short-petiolate, obtuse at both ends, more so at apex and abruptly and stoutly mucronate, upper face not marked by conspicuous venation, the lower showing filiform but clearly elevated feather veins, these not in the least whitened, but green as the rest of the organ; cymes very many, small and few-flowered, everywhere subsessile and surpassed by foliage; sepals lanceolate, short, not reaching the sinuses of the small short-cylindric green corolla.

Plant known only in one good specimen collected by myself in the open prairie near Notre Dame, Indiana, 24 July, 1899. I saw in it at the time a near ally of *A. cannabinum* and with green flowers like that, but it has plenty of marks by which to distinguish it. The foliage being not only copious, and of the same size on all the parts, is so small that it might have been well named from that character.

Apocynum platyphyllum. Robust and tall, commonly 4 feet high, stem and branches deep-green without trace of bloom or pallor and glabrous, so also the upper face of the foliage, except as marked by a distinct though not broad whitish midvein and numerous finer and almost divaricate

feather veins; properly cauline leaves very large, conspicuously and stoutly petiolate, the blades of long-oval outline, 4 inches long, 2¼ inches wide, obtuse at both ends, at apex strongly mucronate, those of the branches less than half as large, varying from oval-elliptic to elliptic, all of very firm texture, even rigid, and pale beneath as with bloom, but also roughened along the veins and all veinlets with stiffish white hairs: cymes rather many, those of the lateral branches far surpassing the terminal; sepals broadly lanceolate, acute or acuminate, more than equalling the tube of the short and subcylindric green corolla the lobes of which are broad and obtuse as well as very short.

Wells County, Indiana, in low ground, bordering lakes in Jackson Township, Chas. C. Deam, 23 July, 1895.

Apocynum Sarniense. Perhaps a yard high, but with few and suberect branches, both stem and branches purplish and pubescent with short curved dark-colored hairs; cauline leaves 3 inches long, more than half as wide and of long-ovate outline, short-petioled, rounded at base, the apex rather acute, sharply mucronate, the upper face rather bright green, glabrous, the lower paler and with a thin coat of whitish tomentum: cymes few-flowered, terminal on both main stem and each branch, but the branches subequal; sepals triangular-lanceolate, acute, these and the exterior of the corolla tomentulose; corolla pinkish, very large for the *cannabinum* group and distinctly campanulate, cleft well toward the middle and the lobes acutish.

Type specimen in U. S. Herb. sheet 444,792, collected 3 Aug., 1902, at Sarnia, Lambton Co., Ontario, by Charles K. Dodge. The species, though of the *cannabinum* group, has flowers as much like those of the other section as have some of the Pacific species; but the flowers are not quite erect, another circumstance to render the plant another connecting link between two groups which one would like to regard as subgenerically distinct.

Having drawn up this diagnosis, I open a pocket attached to the sheet containing the specimen, and find within it the proof that Mr. Dodge ten years ago, when he sent the specimen to the U. S. Herb. for a name, was not content to have it called, as it had been, *A. pubescens*. His pencil note of protest against such an "identification" reads: "This was identified last year as *Apocynum pubescens* R. Br. I should like to have this reconsidered. If necessary I will furnish a whole plant, fruit and all. It did not seem to me the name was right. Collected along the road, where it is wet in spring and fall, and very dry in summer."

Apocynum Farwellii. A yard high, very stout, only sparingly branched, and that only far above the middle, the main stem glabrous and glaucous up to near the middle, above that, as also the branches, hirsutulous; cauline leaves 3 to 4 inches long, broadly oblong, cordate at base and sessile, only cuspidate-mucronate at apex, not acute; the rameal not so very much smaller, but elliptic and short-petiolate, all glabrous or nearly so above, sparsely fuscous-pubescent beneath: inflorescences few, and much as in *A. Sarniense* as to size and location, but flowers of the smallest; sepals lanceolate, acuminate, almost equalling the corolla, this short-cylindric, its lobes deltoid, acute.

Collected near Detroit, Michigan, 7 July, 1893, by O. A. Farwell, and distributed for *A. pubescens*, also again 30 June, 1899, in less pubescent, indeed almost glabrous state, and sent out without specific name.

Apocynum Bebbianum. Main stem and height of plant not certainly known, the flowering branches densely leafy with a firm broadly elliptic foliage 1½ to 2 inches long, cuspidately mucronate, conspicuously veiny and on both faces tomentose, but as to the upper more sparingly so, and more along the veins than on the surface in general: cymes small and few-flowered, not equalling their subtending leaves, the branches

of it, and pedicels as well as calyx tomentose; sepals lance-ovate, short; corolla very small, short-cylindric; follicles short, extended horizontally and nearly straight.

The type specimens are in my herbarium, sheet 6987, as communicated to me many years since by H. N. Patterson, and were collected long ago in Winnebago Co., Illinois, by M. S. Bebb. Better specimens than mine may perchance exist in other herbaria. A more recent specimen of what may be specifically the same is on my sheet 6988, as distributed from somewhere in Illinois in 1879, by Mr. Eggert of St. Louis; but this, though nearly as tomentose as the type, has a thin foliage. The specimen, however, is in a younger state.

Apocynum dictyotum. Evidently tall, rather robust, copiously and amply leafy, the stem and branches somewhat reddened under a nearly white coating of bloom, the main stem also loosely hairy somewhat in lines; leaves of main stem 4 inches long, 1½ in width near the middle, oblong-oval, at base subcordate, short-petiolate, obtuse at apex and mucronate, the rameal leaves one-third to one-half as large, nearly elliptic, all of a light glaucous hue of green and slenderly whitish-veiny above, beneath very much whitened by bloom as well as by a minute white-setulose indument, this also heightened by a system of prominent finely reticulated whitish veinlets: cyme large, short-peduncled, many-flowered; sepals ovate-lanceolate, not equalling the corolla-tube, pubescent; corolla small, short-cylindric.

This species, very beautiful as to singularly whitened and reticulated foliage, occurs in U. S. Herb. only as collected by Mr. A. S. Heller near Suffolk in extreme southeastern Virginia, in June, 1893.

Apocynum procerum. Very tall and robust, the stem leafy and without a branch for the first 2 feet or more, then with a few strict branches for the flowering, the whole height of the plant 3 to 5 feet, the stem purplish and glaucous, bearing leaves rather approximate and very large, commonly 5 or 6

inches long, 1½ to 2½ inches wide, from oblong and lance-oblong to long-oval, subcordate and rounded at base, or even sessile and cordate-clasping, at apex obtuse but ending in a stout mucro, vivid-green and glabrous above, and with very broad, white midvein, beneath paler, but chiefly by a thin white indument of short tomentellous hairs; rameal foliage of half the size of the properly cauline, oval-elliptic: cymes few and large, borne mostly, or only, at summit of the main axis of the plant, litle surpassed by the few subtending sterile leafy branches: sepals long, triangular lanceolate, surpassing the tube of the small short whitish or greenish corolla.

This perfectly distinct and very notable ally of *A. cannabinum* has been well represented in my herbarium in four fine sheets sent me by Mr. Luman Andrews of Southington, Connecticut, in the summer of 1903. They were collected by Mr. Andrews in the neighborhood of Southington, 17 July, when the plant was in fair flowering condition, and have remained in my herbarium until now, under the name now published; meanwhile nothing like this plant makes its appearance from any other quarter. The species is said to inhabit open ground, in sandy soil.

Apocynum ithacense. Allied to *A. procerum*, but a small plant, barely 2 feet high, but very erect and strict, stem naked at base for 6 inches, above that bearing 5 or 6 pairs of properly cauline leaves, the lowest oblong, barely 2½ inches long, others oblong-lanceolate, 3 inches long, all subsessile, only mucronately acute, glabrous throughout, bright green above and marked strongly by white midvein and distinct diverging lateral veins; branches few, their leaves elliptic-lanceolate; flowers chiefly in an ample terminal cyme, two only of the branches bearing each a small cyme not far above the main one; sepals long, lanceolate, acute; corolla small, white, the very short tube quite campanulate, the lobes still shorter, broad, obtuse.

A fine northeastern species, white-flowered, collected by Mr. F. V. Coville, 27 June, 1885, at "Six Mile Creek, below

Green Tree Falls, not far from Ithaca, New York." I refer here, with some hesitancy, a plant gathered in southern Pennsylvania, at the "mouth of the Yucquan," in 1893, by Mr. Heller. While much like the present species in most particulars, it is much more whitened with bloom; and the different shades of color in herbage are not to be disregarded in classifying plants of high organism.

Apocynum subuligerum. Plant probably tall, and simple up to the ample compound-cymose and altogether terminal inflorescence, all parts glabrous, glaucous; cauline leaves somewhat lance-oval, 2½ to 3½ inches long, sessile by a subcordate base, acutish at apex and almost subulate-mucronate, upper face of a deep copperas-green, the lower paler; rameal leaves of half-size and tapering to both base and apex, are elliptical: inflorescence of 1 or 3 large corymbose panicles at summit of stem and borne on long peduncles quite above the foliage, the branches of it conspicuously beset at the joints by long slenderly subulate or almost aristiform bracts; sepals similarly subulate-attenuate above the lanceolate base and equalling the corollas, these small, not cylindric as in most *cannabinum* allies, but distinctly campanulate, erect, their lobes deltoid-ovate, slightly acutish.

Type specimens in my own herbarium, sheet 7022, communicated to me many years since by Dr. J. Bernard Brinton, but as having been collected somewhere in the State of Maine as long ago as 1878, by F. L. Scribner. I have seen no eastern specimens making any approach to this in mode of growth and inflorescence. This, in the larger of the two specimens, is as a whole almost flat-topped, measuring seven inches across. In this particular it recalls my far-away Californian *A. floribundum* and some others of the West. I name it in allusion to the great length and slenderness of the bractlets and sepals.

Apocynum littorale. Akin to *A. album*, taller and more robust, less widely branching, herbage of a darker green;

sepals deltoid-ovate, short, abruptly acute; follicles comparatively short, stout, straight, slightly divergent from base to apex.

The species as to character, and hydrophile nature, is analogous to my *A. album*, which is of the Potomac shores and southward, while this which I name *A. littorale* is as restricted to brook and river margins at a northerly latitude. The specimens which I take for typical were sent me in 1902 from "gravelly shores of the Farmington River," in Connecticut, as collected 12 Aug., 1902, by Mr. Luman Andrews of Southington. The plants were in good fruit, but past flowering. I did not know, and do not yet know, the flowers of this plant; but after comparison of its fruiting specimens with those of *A. album* in fruit, I saw that here was a species yet undescribed, of the same group, and of the same habitat as to its love of being near running water, though of another geographic and climatic region. I labelled my specimens as new, but imperfectly known. In 1910, in eastern New York—I think it was at Pine Plains—I saw in passing by rail, stream margins almost hedged in by the copiousness of a smallish dogbane which I at the time believed to be what I am now calling *A. littorale*. The dense masses of it were one mark by which, as growing, it would be suspected as being other than *A. album*, for this always grows sparingly, in small colonies, and only here and there; but the characters by which to know each species in fruit, and when dry, are those of the follicles. These in *A. littorale* are stout, 3 to 3½ inches long, both of equal length and of like angles of divergence. In *A. album* they are not only more slender, but measure 3½ to 4½ inches long, one of them straight, the other so curved that the two meet and are in contact at the tip; or, when not in actual contact, are so very near it that as a general characteristic the plain curvature of the one it is impossible to overlook when once it has been pointed out.

Another Connecticut station for *A. littorale* would seem to be Stratford, whence a good fruiting specimen is in U. S. Herb. as collected on "a dry beach," by Dr. Edwin H. Eames.

30 Aug., 1895, who also notes it "infrequent." The fact that Dr. Eames writes no specific name to the sheet indicates his inability to refer this plant to *A. cannabinum*; and this label quite antedates the point of time when, by the publication of my *A. medium* and *A. album*, in 1897, the botanists of New York and New England became awakened to the fact that we have here more apocynum species than the two that had been known to Linnæus. Dr. Eames' Stratford plant is certainly *A. littorale* rather than *A. album* despite the consideration that, like *A. album*, it may adapt itself to maritime situations. One would like to know whether from the stream borders of northern Connecticut this thing continues all the way down to the sand beaches of Long Island Sound. One would like to advise those botanical friends in Connecticut to a little more boldness in investigating their flora, and that in a frame of mind to admit the possibility that the newest edition of Gray's Manual may fall short of an absolute finality as to matters of Connecticut botany.

Another sheet before me which I can not label as other than *A. littorale* will extend the range of the species to the shores of the Susquehanna River and its tributaries in southern Pennsylvania. This was collected by Mr. Small "Two miles north of Wrightsville, York County," 7 July, 1890. It is not quite typical, being somewhat too pale with bloom, and its pods are thicker, longer, and much less divergent. To *A. album* it is farther still from being conformable; and the truth will very likely turn out to be that there is a considerable group of these small, white-flowered littoral species. Mr. Fernald's n. 84 of the Maine Flora seems white-flowered, is smaller than *A. album*, probably to be proven distinct, certainly far removed from *A. cannabinum*.

Apocynum arenarium. Akin to *A. album*, like it white-flowered, but much taller, more sparingly branching, less leafy, leaves much more distinctly and slenderly petiolate, of thinner texture, their pattern more inclining to lanceolate; all the parts glabrous, not even the lower face of foliage very

notably glaucous; cyme apparently terminal only, but long-stalked and rather loose; sepals triangular-lanceolate, not very acute; corolla white, the tube slightly campanulate, the lobes erect, but broad, short and obtuse.

From a sand bar at Plum Point, on the shore of Chesapeake Bay, southern Maryland, collected 5 Aug., 1902, by Geo. H. Shull, and deposited in U. S. Herb., under the collector's determination as "*A. album*, Greene"; but the plant, while clearly white-flowered, has corollas of a peculiar pattern for those of any eastern ally of *A. cannabinum* in that they are not cylindric, but distinctly campanulate. They have also more obtuse lobes than are to be found in any other known member of either group. The habitat of *A. arenarium* is maritime.

Apocynum cervinum. Plant 3 or 4 feet high, simple to above the middle, there only twice or thrice dichotomous, of a very pale glaucous hue throughout, the lower face of foliage hardly more so than the upper, the venation not particularly conspicuous though almost white; leaves of main stem 4 inches long, 1¾ in width, oblong-oval, rounded and subcordate at base, at apex abruptly acute as well as mucronate; cymes of thrice the size of those of *A. cannabinum*, long-peduncled, many-flowered, the flowers large for the group, also whitish; sepals lanceolate, mostly not acute, not equalling the corolla-tube; corolla whitish but with a lurid tinge of something between green and purple, the tube short-cylindric, the lobes broad, ovate, obtuse, somewhat spreading.

This is C. F. Baker's n. 80 from the Gunnison River region in southern Colorado, collected at Deer Run, where said to be common in moist ground. It was a hasty judgment that allowed this to pass for *A. cannabinum*.

Apocynum convallarium. Herbage glabrous, and of the brighter and more vivid green of *A. cannabinum*; but here more than ordinarily bright, all the foliage marked very conspicuously with whitish midvein and feather veins, and this even to the pale glaucescent lower face; proper cauline leaves

lance-oval, the largest seen 3 inches long, 1¼ in width, rounded and subsessile at base, the apex very acute; rameal leaves one-third smaller, elliptic-oval: cymes terminal, sessile, but quite many-flowered and rather loose; flowers small, lurid flesh-color and not erect, neither exactly nodding, but extended almost horizontally; sepals lanceolate, long for the short campanulate corolla.

Two specimens in U. S. Herb. are before me, both from northwestern Montana, the localities some 130 miles apart. One is from near Meeksville, in the Clark's Fork Valley, by J. B. Leiberg, 22 Aug., 1895. This, a large specimen, but of the top only of a plant, indicates a size comparable to that of the great *A. cannabinum* of the Potomac Valley. It does not show any other than the rameal foliage, and is almost past flowering. The other specimen is from Midvale, by L. M. Umbach, 14 July, 1903. This is in flower, and shows the uppermost cauline leaves. I name the species solely in allusion to the valley habitat, not as indicating any likeness to Convallaria. If the flowers of this, in form, attitude and color are not those of *A. cannabinum*, still as to all the vegetative characters, and general appearance, it is of that group.

Apocynum bolandri. Plant low, barely a foot high, branched divergently from near the base, the spread of the branches equalling the height of the plant; all the leaves oblong-lanceolate, very short-petioled, acute at apex, from 3 inches long in the properly cauline to less than 2 inches in those of the branches, colored much the same on both faces, but more glaucous beneath: flowers in a single cyme at summit of the main stem, small; sepals lanceolate and long; corolla short-cylindric, its color uncertain.

Plant known only as collected by Bolander, fifty years since, and reported by him as growing "among rocks in the Merced River, at Clarks, alt. 4000 ft." It is plainly of the group of *A. cannabinum*, and with some special resemblance to my *A. album* of the shores of the Potomac, and *A. littorale* of New York and New England. These two eastern kinds are white-

flowered, and the equally hydrophile *A. Bolandri* may be found like them in this particular, if rediscovered.

APOCYNUM DENSIFLORUM. Plant several feet high, but sparingly branched and only at summit; herbage glabrous and everywhere glaucous, the upper face of the foliage only less so than the lower; cauline leaves ovate-oblong, 4 inches long, 1½ broad, rounded at the base and subsessile, at apex hardly acute, but strongly subulate-mucronate, those of the branches two-thirds as large, tapering to both ends, therefore elliptical: inflorescences 3 only, one large and terminal, the others borne on either side far above it, all short-peduncled and surpassed by their subtending pair of leaves, exceedingly many-flowered but very compact; sepals lanceolate, acuminate, of the length of the tube of the short-cylindric green corolla.

Known only as collected by myself in the mountains of Kern Co., California, near Tehachapi, June, 1889. Although green-flowered, this is at every other essential point widely at variance with the eastern and genuine *A. cannabinum*.

APOCYNUM BREWERI. Of the *cannabinum* division, and very robust, tall and sparingly branched at the very summit only: cauline leaves 3 or 4 inches long, 1½ to 1¾ inches wide near the base, of elongated oval general outline, but sessile and cordate clasping, at apex obtuse, yet with a prominent though small cusp; lower face of all leaves glaucous, the upper not so, yet somewhat glaucescent: cymes few, apparently only 1 to 3, far surpassed by very leafy sterile branches, short-petioled, many-flowered and dense, the flowers very small; sepals very long and lanceolate, surpassing the tube of the corolla; color of flower apparently deep purplish, but the specimens are fifty years old, the shade therefore beyond exact discovery.

Yosemite Valley, California, W. H. Brewer, n. 1673 as in U. S. Herb., collected 19 June, 1863.

APOCYNUM THERMALE. Both foliage and branches suberect, and all of a dull bluish-green hue almost the same on both

faces of the foliage, the plant wholly glabrous, both stem and branches stout and very straight: leaves 2½ to 3½ inches long, subsessile, oblong-oval, obtuse at base, at apex only abruptly and cuspidately or mucronately acute, the venation green and inconspicuous: cymes short-peduncled, not equalling the leaves subtending them: flowers of the very smallest, erect on extremely short pedicels; sepals short, deltoid-ovate; tube of corolla short-cylindric, the segments short, ovate, slightly spreading, the color apparently dull pale flesh-color.

Tessajara Hot Springs, Monterey Co., California, June, 1901, collected by A. D. E. Elmer. Strictly of the *cannabinum* alliance; a comparatively small plant, with peculiarly strict habit, as well as its own characters of leaf and flower.

Apocynum longifolium. Of the alliance of *A. cannabinum*, perhaps as tall, but comparatively very slender, also very sparingly branching and few-flowered, the stem and branches purple and but little glaucous, the herbage light green and glabrous, the foliage almost equally glaucous on both faces; uppermost leaves of the main stem 5 inches long, barely 1 inch wide, those of the branches 3 inches long or more, all elliptic-oblong, tapering below to a short petiole, at apex ending sharply by a long almost subulate cusp or mucro: cymes few, all greatly surpassed by the subtending leaves, the flowers not many, of the smallest, even fairly minute; sepals ovate lanceolate; corolla with cylindric tube and ovate lobes, the color dull pale greenish purple.

A Californian species, collected on Sespe Creek, near Ten Sycamore Flat, Ventura Co., 9 June, 1908, by Abrams & McGregor. Remarkable for the great length of its leaves as well as the peculiar pointing of them.

The foregoing species, to the number of more than twenty, are of that group headed by *A. cannabinum*. I now proceed with the results of a like inspection of the materials in our herbaria representing the allies of *A. androsaemifolium*. The

paper as a whole will only demonstrate the truth, not very creditable to our botanical forefathers of several generations past, that they never looked at these plants with the eyes of botanists.

The *cannabinum* group finds a fuller development on the Atlantic slope of the continent, the *androsaemifolium* alliance on the Pacific; at least from the Rocky Mountains westward, and in the far away northwest, on the vast volcanic or half-arid plains and mountain districts, this section blossoms out in a multiplicity of dwarf species which in flower are often very specious and beautiful.

Apocynum insigne. Plant a yard high or more and robust, the stem glabrous and green without bloom; cauline leaves elliptic-lanceolate, 5 inches long, 1½ inches wide in the middle, acute at both ends, short-petioled, widely spreading but not deflexed, green above and with a scantily pubescent midvein, underneath whitish, this partly by reason of a dense bloom, and partly as being thinly hirtellous with white hairs: cymes as in other members of its group terminal and axillary, but strongly developed and very many-flowered; flowers apparently colored as in *A. androsaemifolium*, but not more than half as large; sepals short, deltoid-ovate; corolla campanulate, deeply lobed.

Mountains of Virginia, the specimens collected by Gerrit S. Miller on Stony Man Mountain, near a large spring, 3 July, 1903. The species is allied to *A. medium* of the Potomac Valley, District of Columbia, but is twice or thrice as large, with extremely different foliage and large clusters of small flowers. The follicles in this very large species are the smallest known in the genus.

Apocynum leuconeuron. Akin to *A. androsaemifolium*, evidently larger, probably a yard high, the foliage more elongated: leaves lance-ovate, those of the main stem 3½ to 4 inches long, 1½ to 1¾ inches wide a little below the middle, of firm texture, dark green and glabrous above, paler beneath

and there sparsely pubescent on the general superficies, but densely so along the conspicuously white and broad veins: flowers smaller than in the allied species, produced in sessile but exclusively terminal cymes; sepals lance-ovate, short; corolla with short subcylindric tube and deeply cleft limb, the color apparently pinkish.

Type in U. S. Herb. from Cockrell, Missouri, 3 July, 1898, B. F. Bush. The leaves of the stem in this are deflexed as in the type to which I liken it; the flowers also are not so extremely different as they are in, for example, *A. medium;* but both the foliage, with its strong peculiar veininess, and the strictly terminal inflorescence, seem to claim for the plant the rank of a species.

Apocynum silvaticum. Akin to *A. androsaemifolium*, rather stout, 2 feet high, the stem naked to the middle, there parted into 2 or 3 once or twice dichotomous leafy and flowering branches: leaves large for the plant, 2½ to 3 inches long, 1½ to 1¾ inches wide, and widest at the middle, the outline being mostly rhombic-ovate, with here and there one of oval outline, all tapering to the base and short petioled, acute at apex, ascending or somewhat spreading, never drooping, the upper face deep green and glabrous, the lower pale with bloom, also along the veins hirsutulous with white hairs, a few distributed to the general face: cymes more terminal than subterminal, all with long peduncles and numerous pinkish flowers: sepals short, deltoid-ovate; corolla quite open-campanulate and with broad short lobes.

Joplin, Missouri, B. F. Bush, n. 2271 as in U. S. Herb., collected 7 June, 1909; distributed as *A. urceoliferum* to which it is not by any means correctly referable. Rocky Woods are given as its habitat.

Apocynum ellipticum. Plant with purple and glabrous stem and branches devoid of bloom; leaves remarkably firm of texture, fairly subcoriaceous, dark-green above, very pale and glaucous beneath, in outline exactly elliptical, short-

petioled, widely spreading; cymes both terminal and axillary, elongated and many-flowered, in full development forming an ample inflorescence, yet not at all corymbose; sepals ovate, or lance-ovate; corolla pinkish or purplish, not large, the tube cylindric but very short, the segments as long or longer.

An ally of *A. androsaemifolium* from the Guadalupe Mountains of Texas, collected by Vernon Bailey, 19 Aug., 1901. The foliage is well characterized both as to form and texture. The corollas are smaller than in the more familiar ally, far more numerous, and of different form, being in no wise campanulate.

APOCYNUM VACILLANS. Plant of the largest, probably very tall, glabrous throughout, the herbage vivid green as to upper faces, the lower singularly ash-colored by something like a grayish bloom, but this hardly effaceable: cauline leaves lance-ovate, 4 or 5 inches long, 2 inches broad below the middle, subsessile, rounded at base, at apex scarcely mucronate but acute; those of the branches not half as large, almost precisely elliptical, acute at base, at apex very acute: cymes few-flowered, most terminal but some lateral, and all sessile: flowers rather small, not erect; sepals lanceolate, nearly equalling the short tube of the campanulate corolla, of which also the segments are long, equalling the tube, the whole corolla colored much as in *A. androsaemifolium*.

The only specimen before me of this fine plant was collected somewhere in the State of Washington as long ago as 1889, by Geo. R. Vasey, and preserved in U. S. Herb. Some one has labelled it *A. cannabinum*. Looking at nothing but the upper face of the leaves, this would be any one's hasty judgment of it as to its nearest affinity, for not only is that face of the shade of green characteristic of that group, but the leaves are rather ascending than otherwise; at least, they have not the spread, much less the decided droop of those of *A. androsaemifolium;* but when one attends to the inflorescence and the flowers one finds them entirely those of the group headed by the species last named. It is the best case I have met with

of ambiguity between the two groups, and I have named it in reference to that characteristic.

APOCYNUM ELMERI. Distinctly and in all respects of the group of *A. androsaemifolium*, the foliage oblong-elliptic, deep green above, very glaucous beneath, the cauline leaves 3 inches long, 1¼ wide in the middle, tapering to a narrowed but at last subtruncate base, at apex mucronate-acute: the branching of the plant for the flowering quite fastigiate, the inflorescence as a whole distinctly corymbose, both the terminal and lateral cymes well pedunculate and many-flowered; sepals triangular-lanceolate, not equalling the tube of the corolla, the segments of the corolla not as long as the tube; the whole flower pinkish or purplish, all of them standing out horizontally on slender pedicels of quite unusual length.

This is another Washington species, collected in Whitman County, in 1896, by A. D. E. Elmer. Although the collector himself labelled it *A. cannabinum*, it lacks every mark of that species. Its leaves are dark-green, they droop; the individual flower is as clearly as far from that of *A. cannabinum* as is the inflorescence. Such a plant, so clearly a western relative of *A. androsaemifolium*, places it beyond doubt that my *A. pumilum* is no mere subspecies.

APOCYNUM GRISEUM. Plant evidently tall, only the flowering branches taken, these a foot long, flowering only terminally and from the two uppermost axils as in *A. androsaemifolium*, below the inflorescence leafy, the leaves in 3 or 4 pairs, distinctly petiolate, neither deflexed nor ascending, but spreading horizontally, the blades broadly ovate, subcordate, the apex only acutish, 1½ to 2 inches long, 1 to 1¼ inches wide near the base, the branches, peduncles, pedicels, calyx, and the leaves beneath gray with a fine short tomentum; upper face of leaves of the usual dull-green and minutely as well as sparingly pubescent: flowers not numerous, of a flesh-purple hue, the sepals lanceolate, shorter than the corolla-tube, this and the whole of the corolla campanulate, but the lobes narrow, and with unusually wide sinuses between them.

Near the boundary between the United States and Canada, for northwestward, between the Columbia and Kettle Rivers, within Canadian territory, collected by J. M. Macoun, 6 June, 1902, Geol. Surv. No. 66,555 as in my herbarium ; distributed for *A. androsaemifolium*.

Apocynum ovalifolium. Plant a foot high or more, stoutish and with few and opposite brachiate branches : leaves firm, even subcoriaceous, short-petioled, of exactly oval outline, obtuse, inconspicuously mucronate, of a very dull dark-green above and very minutely and somewhat granulately puberulent, the lower face glaucescent, glabrous : cymes pedunculate, terminal and subterminal, few-flowered ; sepals lanceolate, acuminate, very long, equalling the tube of the corolla ; corolla rather small, flesh-purple, its segments elongated-oval, almost as long as the tube.

Collected along Rogue River, Jackson Co., Oregon, 21 Aug., 1897, by Mrs. R. M. Austin. Manifestly of the group of *A. androsaemifolium* despite the fact that its corolla-tube, though short, is not campanulate but short-cylindric ; also the flowers are nearly erect, which is also out of character for the group. The indument of the surface of the leaf is very minute ; perhaps a granular coating merely, but it imparts a dulness of color that is peculiar.

Apocynum rubicundum. Plant large and stout, glabrous in every part, the foliage spreading or deflexed, of a firm almost coriaceous texture, all the leaves oval, the largest 3 inches long, 2 inches wide, distinctly petiolate, the base very obtuse, the apex also rounded, but conspicuously mucronate, dark-green above, pale beneath : flowers many in clusters terminal and subterminal and borne beyond the leaves ; sepals ovate-lanceolate ; corolla small, rather narrowly campanulate, but deeply cleft, of a pale rose color.

Collected by Kirk Whited, at Stines, Chelan Co., Washington, 11 Aug., 1901, and distributed with no show of reason for *A. pumilum*. The plant is larger and stouter than the

largest *A. androsaemifolium*, but with smaller and quite reddish flowers. It has an almost coriaceously thick foliage, and is of the arid interior of the county.

Apocynum stenolobum. Plants branched from almost the very base; only 6 to 10 inches high, glabrous throughout: lowest leaves small, oval obtuse, ½ to ¾ inch long, the others exactly ovate, 1½ inches long, obtuse at base, scarcely acute at apex though there very prominently subulate-mucronate, of thinnish texture, very dark-green above, whitish with bloom beneath, the upper ascending on rather long and slender petioles, the lower widely spreading or even deflexed: flowers few and large, mostly terminal; sepals triangular-lanceolate, with long and slender acumination; corolla with long narrow cylindric tube and very long oblong-linear suberect segments, the whole little less than ½ inch long, pinkish or flesh-color.

This is another of the fine discoveries of Mrs. R. M. Austin in extreme northwestern California, where she obtained it, on Davis Creek, Modoc Co., in 1895. It can have formed no part of the Grayian var. *pumilum*, for that author never saw this plant. The type sheet is in my own herbarium, n. 7052.

Apocynum paniculatum. Plant a foot high more or less, with short naked main stem erect, but the branching above this wide and somewhat fastigiate, the branches copiously leafy, all of them at summit very definitely cymose-paniculate: leaves about 1½ inches long, 1 inch wide, mostly of precisely ovate outline, but many oval, very short-petioled, at base subcordate, at apex obtuse or only acutish, of rather firm texture, dark-green above, glaucous beneath, spreading apart, but not drooping; numerous flowers borne above all foliage in about 5 to 7 simple or compound cymes of which the terminal one is not larger than the laterals which join it to form an apparently panicled inflorescence: sepals triangular-lanceolate, acute, the tips straight; corolla with long tube

slightly widening upwards, the segments of more than half its length, ovate-oblong, acutish, recurved.

The habitat of this exceedingly beautiful dwarf dogbane is along Warner Creek, in the extreme northeastern corner of California, which forms a part of the great volcanic and half desert region that is extensive in adjacent Oregon and Nevada. The very fine specimens before me belong to my own herbarium and were collected by Mrs. R. M. Austin, in August, 1882. The panicled inflorescence, of numerous and large flowers, is not peculiar to this one species. It marks my *A. tomentellum* of western Nevada, and several more.

Apocynum eximium. Plant dwarf and large-flowered, but somewhat larger than the last, the stems 8 to 12 inches high, solitary, leafless and naked below to the height of 3 or 4 inches, thence simple or with only 2 or 3 branches, glabrous throughout; lower leaves round-oval, ¾ inch long, the others mostly ovate to round-ovate, 1¼ to 1¾ inches long and near the base almost as broad, all very obtuse, or the very uppermost retuse, yet none lacking a short abrupt mucro; texture firm, the upper face dark-green, the lower glaucous: flowers few, very large, in terminal and subterminal cymes; sepals short, deltoid-ovate; corolla quite ½ inch long, flesh colored, the long tube slightly widening, the lance-oblong obtuse lobes nearly as long as the tube, and merely ascending.

Collected by W. N. Suksdorf, in Falcon Valley, Washington, in 1886, distributed by him for the Grayian var. *pumilum*, of which wondrous aggregate it may or may not have formed a part.

Apocynum polycardium. Low, widely branched from the base or near it, 9 or 10 inches high, the breadth of the plant as a whole a foot or more; stem and branches tomentulose-puberulent, densely clothed with a spreading and exactly heart-shaped small foliage; leaves 1 to 1¼ inches long, very obtuse, or even retuse, at apex and mucronulate, dark-green and puberulent above, glaucous and sparsely pubescent be-

neath; flowers few, pinkish, large for the plant, in subsessile terminal and subterminal cymes; sepals very short, deltoid-ovate, barely acute, of hardly one-fourth the length of the broad subcampanulate tube of the corolla; corolla-limb of deep narrowly oval and obtuse spreading lobes.

The fine specimen in U. S. Herb., representing a very marked species, is from Jackson Co., southwestern Oregon, and was collected 14 July, 1892, by E. W. Hammond. The foliage in this is so copious, and so perfectly heart-shaped as to invite, better than any other species, such a name as *cordatum* or *cordigerum*.

APOCYNUM PLUMBEUM. Dwarf 5 to 7 inches high, parted into 3 or 4 branches widely spreading from near the base, each with a compound-cymose terminal inflorescence, the whole herbage glabrous and of a leaden gray with density of bloom; lowest leaves orbicular, only ½ inch across, the others twice or more than twice as large, ovate, obtuse, mucronate, spreading or even drooping on their short but slender petioles: flowers very small, reddish or purplish, the calyx with distinctly turbinate and undivided basal part, and broadly lanceolate segments not equalling the middle of the corolla, this tubular and slightly ventriose to near the summit, there cleft into oblong recurved lobes.

Western Nevada, in the Walker River region, collected fifty years since by W. H. Brewer, "near West Branch of Walker River." Remarkable for the dull lead-color of the stem and both faces of the foliage, and hardly less so for the small tubular corollas that imitate those some ericaceous plants.

APOCYNUM XYLOSTEACEUM. Plants 6 inches high, the stem naked below for about 2 inches, then parted into several suberect branches closely leafy and flowering terminally and in some upper axils; leaves all small, ovate varying to oval, mostly ¾ inch long, obtuse at both ends, nearly all abruptly deflexed, of a very dull dark green above, glaucous beneath, glabrous everywhere; flowering copious in terminal and a few

subterminal subsessile cymes; sepals lanceolate and long, yet far from half equalling the long tubiform corolla, the oval obtuse segments of which are of less than one-third the length the tube and erect.

A diminutive species known to me in but a single sheet in U. S. Herb., of three excellent specimens collected in the Klamath Valley in southern Oregon almost fifty years since by Dr. H. M. Cronkhite, U. S. A. With its small tubular corollas like those of some dwarf caprifoliaceous shrubs, this would pass at first glance with the uninitiated for a xylosteum or a symphoricarpus.

Apocynum pulchellum. Dwarf and depressed, the stems only 6 to 10 inches long, decumbent, or even for their whole length almost reclining, much branched, puberulent; leaves mostly spreading horizontally on distinct but short petioles, seldom deflexed, oval, obtuse at both ends, the largest only ¾ inch long, ½ inch wide, firm, dark green and glabrous above, pale and sparsely pubescent beneath: cymes numerous, and from several of the upper axils, occasionally, and to the number of 5 or more, panicled above the upper pair of leaves; pedicels hairy under the calyx, the hairiness extending upwards along the middle of the sepals, these broadly lanceolate, acuminate: corolla very large, purplish, the tube long and cylindric, the lobes nearly as long as the tube, oblong, obtuse, not widely spreading.

Mountain meadows of Lassen Co., California, collected long ago by Mrs. R. M. Austin. This remarkably beautiful dogbane is so small, and with such diminutive and rounded foliage, as to give it the appearance of some small caprifoliaceous plant, a dwarf snowberry, for example.

Apocynum rotundifolium. Of the size of *A. pulchellum*, but upright, branching only fastigiately, and from above the base, glabrous throughout; lowest leaves almost exactly

orbicular, 1 inch across, the next slightly verging to ovate, 1¼ inches long, all nearly sessile, widely spreading, none deflexed, of subcoriaceous texture, dark green above, very glaucous beneath, cymes both terminal and axillary small and on short peduncles; sepals broadly and deltoidly lanceolate, their slender tips recurved; corolla purplish, large, the tube subcylindric, slightly ventricose, being a trifle constricted under the comparatively very short lobes, these of barely one-third the length of the tube, obtuse and recurved.

Known chiefly as collected in the Sierra Nevada of California, somewhere in Placer Co., in Sept., 1892, by A. M. Carpenter.

APOCYNUM ARCUATUM. Dwarf barely 7 inches in height, but the plant by virtue of its long and recurved branches measuring more than a foot across; all the herbage puberulent, both faces of the leaves hirtellously so, the lower quite pale with bloom, the upper dull dark green: all the lowest leaves small and subreniform, those next them orbicular, the others round-oval, the largest about an inch wide: flowers very large, but not very numerous, in short and subsessile terminal and lateral cymes; sepals short, lance-ovate, these and the pedicels villous-pubescent: corolla with subcylindric tube only very slightly wider above than below, the segments in length approaching that of the tube, elongated-oval, little spreading.

The plant is known to me only as collected in 1892 by Mr. Jepson, the locality being the South Fork of Eel River, California, a station that might lie in Lake County or Mendocino, probably Lake. It forms part of my *A. pumilum* published in the Bay-Region Manual, and is my sole warrant for attributing to the species there so named the character of subreniform lower leaves. By this mark, fortified as it is by the arcuate and elongated branches, and flowers of their own peculiar pattern, the plant must claim specific rank; and since nothing of this, nor of anything much like it, was ever seen by Asa Gray, it

could not have been a part of his "variety *pumilum*," a thing which can have no status any way, even as a variety, because it was never described.

APOCYNUM CERCIDIUM. Plants 5 to 8 inches high, widely branched from the base, the width of the plant equalling its height, densely leafy with a very large foliage, the short cymes partly surpassed by it, every part of the plant glabrous; lowest leaves orbicular and smallish, the next also suborbicular yet perceptibly longer than broad, 1½ inches long, the width less by ⅛ inch, subcordate at base, retuse at apex, the usual mucro obsolete, other foliage broadly oval, obtuse at both ends, mucronulate, all the leaves spreading or slightly ascending, none deflexed; flowers few, terminal and axillary; sepals triangular-lanceolate, acuminate, of less than half the length of the tube of the corolla; corolla not large, quite campanulate, the lobes long-oval, obtuse.

Fort Bidwell, Modoc Co., California, June, 1903, collected by Mary A. Manning; type in U. S. Herb., sheet 667,872. Flowers more nearly like those of *A. androsaemifolium* than in any other species, but the plant a dwarf, with large foliage recalling that of the genus *Cercis*.

APOCYNUM AUSTINAE. Plant 18 inches high, simple and leafless for the first 6 inches, then parted into a very few ascending branches sparsely leafy, at summit, loosely but freely flowering, in all parts glabrous; leaves small for the plant and all deflexed, short-petiolate, ovate, obtuse, mucronate, averaging 1 inch long, dark-green above, pale beneath; sepals short, ovate, acute, somewhat spreading; corolla of middle size for this group, narrow, cylindric nearly, and that from base to orifice, the oblong, obtuse segments of half the length of the tube, but erect; follicles 4 inches long, straight, closely contiguous and erect.

Lassen Creek, Modoc Co., California, Aug., 1894, Mrs. R. M. Austin, the type in my own herbarium, n. 7106.

APOCYNUM LURIDUM. Low, widely branched from an inch above the base, but only 8 inches high, the branches copiously leafy, but the leaves ascending, or only spreading, large for the plant, those at summit as large as those near the base, and fully equalling when not surpassing the sessile inflorescences; lowest leaves small, orbicular, the next large, suborbicular, retuse, the rest oval, obtuse, mucronulate, average length of leaves more than 1 inch, all glabrous, deep but hardly dark green above, glaucous beneath; sepals ovate, acuminate, short for the corolla, this nearly cylindric as to the rather broad tube, the oval obtuse lobes of more than one-third the length of the tube and spreading, the whole of a deep lurid purple like that of some solanaceous flowers.

Lassen Creek, Modoc Co., California, Aug., 1894, Mrs. Austin, the only specimen being in my own herbarium, n. 7107.

APOCYNUM DIVERSIFOLIUM. Plant 10 inches high, simple, rather closely leafy from base to summit, sparsely pubescent as to stem and both faces of the leaves, of which the lower pairs are orbicular, ¾ inch across, those in the middle portion of the stem ovate, 1¼ inches long, the uppermost pairs oval and smaller, all obtuse, faintly mucronate, dark green above, paler beneath; terminal inflorescences borne well above all foliage, the lateral cymes when present surpassing the leaves subtending them; sepals short, ovate, scarcely acute; corolla purplish, of a broad cylindric tube and rather large oval obtuse reflexed segments.

Collected at Fredalba in the San Bernardino Mts., southern California, 22 July, 1902, by Le Roy Abrams, distributed for *A. pumilum* as many another excellent undescribed species has been. This one, like several other of the dwarf kinds of California and Oregon, departs somewhat from the general characteristics of *androsaemifolium* allies in that the corollas are nearly erect, never quite nodding.

New Species of Trautvetteria.

TRAUTVETTERIA NERVATA. Basal leaves not of the largest, pedately rather than palmately parted almost to the base, the primary segments narrow, their lobes almost divaricate, forming oblong sinuses by overlapping each other above: flowers not known: achenes numerous, much compressed, obliquely somewhat lunate, narrow at base, a distinct nerve or prominent secondary vein traversing each interval between two primary ribs, the whole head round-ovate rather than spherical.

In rich damp woods near Dublin, Georgia, 21 June, 1902, collected by Roland Harper. It is the first strongly marked species that has been added to genus since its establishment; both the one belonging to the Pacific coast of America, and the Japanese species, differing from the Atlantic American type by no very striking peculiarities. But this Georgian species at the very first glance at even the foliage declares itself as something well marked and distinct; and the ovate heads of achenes are another peculiarity that is obvious enough; but the secondary nerves, running the whole length of the carpel, constitute a character which calls for an amendment of the diagnosis of the genus. So also does the nature of the achene as being much compressed laterally after the manner of *Thalictrum*.

TRAUTVETTERIA FIMBRIATA. Foliage not large, of firmer texture than in *T. grandis*, of a lighter green, almost glaucescent beneath, the radical leaf of suborbicular contour and 6 inches across, deeply cut into 5 or 7 subrhomboid segments entire as to their cuneate-tapering base, the rest of the segment fimbriate-lacerate: both the cyme and the individual flower very large for the plant, and stamens excessively numerous: achenes small, slightly compressed, broadest at about the middle, tapering abruptly to each end, the space between the ventral rib or angle and the lateral showing a very prominent nerve which, as a branch of the ventral, runs

diagonally to about the middle of the achene and there ends abruptly; style prominent, but not long as in *T. grandis*.

A beautiful and well marked species, evidently rare, known only as collected by W. C. Cusick, in "subalpine bogs and stream banks" of eastern Oregon, in June and July of 1886. The leaves in this show narrowly V-shaped sinuses between all the main segments; another distinctive mark. Apparently of this species is a specimen from the Blue Mountains, southeastern Washington, by Robert M. Horner, collected in July, 1897.

Trautvetteria applanta. Plant not large, 1½ feet high, the radical leaf 6 inches broad or less, subtruncate at base, the sinuses between the lobes oblong, nearly closed, the lobes rather evenly and very acutely serrate-toothed, the whole leaf very firm and strongly veined and nerved: achenes many, much more compressed than in other species, the sides obliquely elongated oval, not narrowed sensibly at either end, the summit appearing obtuse, the short style so lateral as to appear below the geometric summit of the achene, the sides commonly showing a longer or shorter nerve between the ventral angle and the lateral.

The habitat of this is the middle West southward, beyond the Mississippi. The specimens before me are from southern Missouri, and were gathered at Monteer, by B. F. Bush 27 July, 1899. It is said to be common on river bluffs, presumably wooded.

Trautvetteria rotundata. Plant of the largest, with ample foliage thin and not obviously veiny; radical leaf 9 inches wide, parted nearly to the base, the sinuses narrowly oblong, mostly closed, the segments coarsely and unevenly somewhat incise-toothed, but the teeth obtusish: heads of carpels small, globose, the achene as broad as long and suborbicular, not much inflated, the style rather long.

Borders of Mill Creek, Plumas Co., California, collected by Mrs. R. M. Austin, in 1877, the only specimen seen being in

my herbarium; but the plant was evidently communicated to Dr. Gray at the time, for there is a mention made of it by Mr. Watson in the Californian Geological Survey Botany, vol. ii, p. 425; but this Californian plant is not there described. It had not been botanically looked at by either Gray or Watson. The description which I thus refer to is that of the Oregonian *T. grandis*, which Watson proposed to restore, after Gray (Proc. Am. Acad. viii, p. 372) had reduced it. This Californian plant does not at all answer to *T. grandis*, even as to foliage, much less as to its achenes. In *T. grandis* these are not at all suborbicular, but broad and rounded as to the upper part only, thence tapering to the base.

Trautvetteria saniculifolia. Plant barely 2 feet high, the stem bearing 3 or 4 ample long-stalked leaves, no truly basal one obvious; leaves of orbicular circumscription, but deeply 5-parted and without basal sinus, the lower lobes overlapping, the segments narrowly cuneate-obovate, coarsely serrate-toothed above the middle, all of very thin texture, without prominent veins, but the upper face conspicuously fine-reticulate throughout, both faces glabrous, the lower of a deeper and a glossy green: fruit unknown.

Species known only as collected by Mr. Heller, about Lake Waha, Nez Perces Co., Idaho, in June, 1896. The leaves have exactly the cut of those of typical *Sanicula*. Their copious development up and down the stem is another character, and the beautifully reticulate surface is another.

Trautvetteria media. Plant of the largest, the radical leaf a foot in diameter, often less, cleft almost to the base, the segments showing long narrow mostly closed sinuses, themselves 3-cleft and very coarsely and irregularly serrate-toothed: achenes small, tipped with a rather long style that is closely circinate, the space next the ventral suture with one or two short nerves.

A New Mexican species of the upper Gila River in Soccorro Co., growing at 9000 feet in the mountains; the specimens

gathered by O. B. Metcalfe, 15 Aug., 1903, and distributed under the name of *T. grandis* on my authority. That determination was made quite too inconsiderately. While geographically the New Mexican plant is quite as far removed from the habitat of the western species as from the eastern one, the great dimensions of it seemed to connect it with *T. grandis*; also the achenes were seen to have something like the more elongated beak of those of *T. grandis;* but, on careful comparison it becomes clear that in the species last named the long beak is in the main straight, being merely hooked at the end, while here in the geographically intermediate plant the whole style is coiled into something like a ring; also the body of the achene has markings between the main angles which ally it with the two eastern species above described as new.

Specimens from a very different part of New Mexico, namely of the Pecos River country, are in U. S. Herb., collected in 1908, by Mr. Paul Standley. They are all immature and incomplete. I dare not assume that they are referable to *T. media;* for the foliage seems different, and smaller. Neither do they furnish clear warrant for any opinion that they represent another species.

Some Erigeron Segregates.

Nearly all the new propositions here following under the above title are aptly to be denominated segregates because of their having been listed in books under old names. Superficial glances, and rough guesses as to identity, such as authors often content themselves with, give example to herbarium aids, and to those who collect and sell specimens; thus is engendered wild confusion of many species under one name in the thick bundles of the larger public herbaria; and perhaps none are now worse off in that regard than those of so-called *Erigeron*, this notwithstanding that in recent years not a few new segregates have been indicated by the few of us who

study western botany. Still, there is much more waiting to be done; and those species now proposed are but a continuation, not a conclusion of the task. I take up first in order things that have been passing for *E. glabellus*, *macranthus* and *salsuginosus*.

Erigeron patens. Perennial, stout, rigid, upright, 2 feet high, equably leafy to near the summit, there parted into many long leafy monocephalous branches to form an ample paniculate-corymbose inflorescence: all the foliage remarkably hard and rigid, glabrous except marginally and along the veins: basal leaves not seen, those of the main stem 2½ inches long, widely spreading or even notably deflexed, closely sessile by a broad base, very acute at apex, the general outline elliptic-lanceolate, strongly scabrous-ciliolate, with some similar short stiff hairs along the veins beneath; leaves of the branches half as large, somewhat ovate, acuminate, bristly-ciliate and, like the branches, densely glandular-puberulent: involucres ½ inch high, ¾ inch broad, their bracts not notably unequal, wholly herbaceous, caudately acuminate, purplish and granular-viscid: rays very many, long and shiny, of a rather light purple: achenes strigulous; inner pappus of quite firm bristles, the outer of fewer short and stout ones not clearly squamiform.

Type in U. S. Herb., collected by D. T. McDougal in sloping pine woods of Strawberry Valley, near Pine, central Arizona, 29 Aug., 1891. A poorer specimen of what is essentially the same, though not as much roughened, is at hand from near Flagstaff, Ariz., by M. E. Jones, 6 Aug., 1884.

Erigeron foliosissimus. Allied, like the preceding, to *E. macranthus*, equally, and even more densely leafy to summit, but little more than a foot high, the tuft of basal leaves all fresh and conspicuous at time of flowering, oblong-oval, 1½ to 2½ inches long, including the short and very distinct petiole, obtuse, entire, rather pale-green, faintly nerved, every-

where glabrous except as to a minute marginal series of stiff incurved hairs; the cauline more than an inch long, quite crowded on the upper two-thirds of the stem, oblong-lanceolate, sessile, very acute, not ciliolate, every part showing under a lens a minute roughness of glandular points, this extending equally to the stem and peduncles as well as bracts of the involucre: heads large, only 2 or 3 and short-peduncled at the very apex of the stem; bracts of involucre devoid of pubescence, showing an herbaceous midvein between the two definite scarious margins, only a few of the outer somewhat shorter and wholly herbaceous: rays very narrow, blue-purple: squamellae of the pappus minute, nearly subulate.

Near Fort Huachuca in extreme southern Arizona, Sept., 1891, Dr. T. E. Wilcox; type in U. S. Herb.

ERIGERON GULIELMI. Related to *E. glabellus*, but smaller, the decumbent and almost leafy stems a foot high from a subligneous and branched caudex: basal leaves 1 to 1½ inches long including the rather short petiole, in outline cuneate-oblong, very obtuse, of firm texture, but glabrous on both faces, yet both blades and petioles strongly short-ciliate with curved hairs: stem monocephalous, naked above the middle, below it with here and there a reduced and sessile oblong-linear leaf: bracts of involucre linear, acuminate, herbaceous, glandular-viscid: rays very numerous but not narrow, yet not of the broadest: no heads mature, therefore achenes and pappus not seen.

Well marked, and known only as collected on Bill William Mountain, northern Arizona, by the late Dr. Edward Palmer in 1869; type in U. S. Herb.

ERIGERON SUBASPER. Of the general aspect of *E. glabellus*, much smaller, stout, rigid, all the herbage firmer, and of a pallid, rather than vivid green: basal leaves 1½ to 3 inches long, erect, somewhat obovate-spatulate, tapering to a flat and not very narrow petiole, the limb very obtuse, mucronate;

cauline leaves oval, sessile, obtuse, or in some specimens oblanceolate and acute, both faces of all sparsely scabrous and the margins scabrous-ciliolate, very closely so: heads large, in the more robust 5 or 6 and corymbose, in others 1 or 2, their peduncles with a bract or two: bracts of involucre rather short, all densely strigose; rays numerous, light purple, not very narrow; outer pappus obscure, made up of very short bristles.

Plant common on the San Francisco Mountain, northern Arizona; distributed perhaps first by J. G. Lemmon in 1884, later by C. A. Purpus in 1900, the specimens by the latter distributed for *E. glabellus*, of the former for *E. macranthus*.

The low robust growth, firm pale rough foliage, besides the floral characters abundantly distinguish this from its northern ally, which is *E. glabellus*. I collected a good series of specimens of the plant, near the base of the mountain, in 1889, and they have until now remained in my herbarium without a name.

ERIGERON ELDENSIS. Of the group of *E. glabellus*, but less resembling it habitally, the stems tall, to the height of more than a foot, slender and very erect from the base, probably not clustered but growing singly: basal leaves 3 inches high or less, including the long slender petiole, the blades oval and obtuse to elliptical and acutish, those of the stem an inch long more or less, broadly to narrowly lanceolate, sessile, very acute, all the foliage of very thin texture and glabrous except as to the not very strongly scabrous-serrulate margins: heads 1 to 3, when 2 or 3 the lateral far surpassing the terminal: bracts of involucre rather few, equal, slender and acuminate, only very obscurely scabrous-puberulent; rays purple, narrow, not excessively numerous; outer pappus of extremely small and narrow squamellae or bristles.

Cañons and slopes of Elden Mesa, northern Arizona, at 6600 feet, collected by J. B. Leiberg, 11 Aug., 1901; distributed to U. S. Herb. without specific name, under the collector's number 5387.

Erigeron huachucanus. With the habit and the aspect of *E. subasper*, but the herbage pale almost to hoariness with a rather close investiture of harsh hairs inflexed from a pustulate base: lowest leaves short-petioled and with oval-elliptic blades, those of the stem rather large, many, partly overlapping each other, spatulate-oblong and oblong-obtuse, sessile, narrower ones extending even to the summit near the large head: bracts of the involucre neither very narrow nor at all acuminate, rather obtushish, strigose-hairy on the back; rays many, either white or very pale, of medium width between those of *Erigeron* and *Aster*: achenes strigose-hairy, outer pappus of minute subulate squamellae.

Near Fort Huachuca, southern Arizona, T. E. Wilcox, Sept., 1894.

There is a very beautiful large broad-rayed asteraceous plant very common in the mountains of Colorado, Wyoming, Montana and even far to the northwestward, one which might as well be called an aster as an erigeron, which figures in our herbaria, where there are hundreds of sheets of it, as *Erigeron salsuginosus*; meanwhile there is not in all the United States any plant at all which answers or even comes near answering to that plant of the high North, the "salt plains of the Athabasca" described by Richardson in 1823 as *Aster salsuginosus*. I now name and define our Rocky Mountain plant, according to it the rank it long has called for.

Erigeron callianthemus. The stoutish stems commonly 1½ feet high, often somewhat less, upright above an ascending base, sparsely leafy, often monocephalous, more commonly with one terminal head and a lateral one borne much above the terminal: herbage thin and delicate, to all appearance glabrous: basal leaves of narrowly elliptical blade 3 or 4 inches long and a petiole much shorter than that, or now and then almost as long; cauline leaves ovate and ovate-oblong or

lanceolate, 1½ to 2 inches long, sessile by a half-clasping base, acute, all the foliage without notable veininess and glabrous except as to a minute and obscure marginal series of appressed hairs: peduncles under the heads pale with an appressed and short fine pubescence: involucre of the terminal head fully an inch broad, its bracts wholly herbaceous, apparently in two or more series, their acuminate tips recurved, their margins below minutely glandular-ciliolate and the whole involucre viscidulous: ray-flowers 50–60, broad as in asters but long, the expanded head 2 inches across, color of rays mostly of a rich deep violet, though sometimes paler: achenes silky-strigulose; pappus simple, of rather firm and numerous bristles.

The center of distribution for this fine plant seems to be the southern part of Wyoming and adjacent northern Colorado. It is from that part of the West that the most copious display of specimens is made by the larger herbaria. Excellent examples have been distributed from various parts of Wyoming by Prof. Nelson, from northern Colorado by C. C. Parry, H. N. Patterson, C. S. Sheldon, Geo. E. Osterhout and others, while from southern Colorado it was abundantly sent out by C. F. Baker, and Mr. Standley gathered it in New Mexico. These mentioned are all in flower only. Mature heads with ripe achenes are in my own herbarium in abundance, the specimens all taken by myself on Little Ouray Mountain below Marshall Pass, Colo., in 1896. From Oregon, Washington, Idaho and the mountains of British Columbia come plants named *E. salsuginosus* which seem to belong to this *E. callianthemus;* though from so wide a range, and from such diversity of climatic and other conditions, the plants show a considerable degree of variation, but chiefly as to size of the plants, along with deviations from the typical leaf outline. But there are other western and far northwestern allies that demand rank as specifically separate from this most beautiful of Rocky Mountain asteraceous plants.

E. MEMBRANACEUS Greene, Pitt. v. 294 (1898), was a segregate of the confused *E. salsuginosus* of Gray's Synoptical Flora, and is an ally of *E. callianthemus*, which does not reach the Rocky Mountain region. In my description of the species as based on Mr. Cusick's n. 1771, while depending on the very ample and thin almost filmy leaves, I do not point out that those of the stem are so broad at the point of insertion, as to become amplexicaul, nor that the heads are smaller than in *E. callianthemus* and the peduncles much less pubescent. Mr. Cusick, in his attempt to collect and distribute new material of the species, after I had published it, was not very fortunate. He took his specimens from another locality. They are of hardly one-third the size, and lack the characters of the species. I never should have separated his n. 2112 from *E. callianthemus*, and that is what I call it. But in the Blue Mountains of Oregon *E. membranaceus* is the common species, and was collected there, also in Mr. Cusick's year 1897, by Robert M. Horner, n. 262, and by J. B. Leiberg, n. 2931; and even a year earlier, by Mr. Piper in 1896, while in this year also Mr. Henderson gathered it in Idaho, n. 3662. A specimen collected in the Selkirk Mountains, B. C., by Mr. Shaw I confidently refer here, and less so another from Clayton Peak, Wasatch Mountains, Utah, for this has foliage too acute, also with here and there a tooth.

While the plant which I have named *E. callianthemus*, forming a great part of the *E. salsuginosus* of Gray, and perhaps all of that of Rydberg, occurs all the way between the northern borders of New Mexico and southern British Columbia, with *E. membranaceus* centered in the isolated Blue Mountains and radiating thence into other sections of that mountainous interior of the Northwest that lies to the eastward of the coast ranges and is separate from them, there is a large plant of the higher coast mountains of Washington and Oregon also called *E. salsuginosus* by Gray and by Howell, which has marks by which it stands aloof from my *E. callianthemus*, such as we reasonably look for, when we

know what a completely distinct climatic region those coast mountains have been constituted by nature.

ERIGERON HESPEROCALLIS. Large as *E. callianthemus*, with equally showy heads, with broad purple rays, the pubescence both of stem and leaf-margins more pronounced, the leaves not only thinner and of a less pallid green, but more narrowly lanceolate and instead of being obtuse, or barely acutish, are attenuate-acute; the bracts of the involucre are more distinctly scaberulous and less viscid, the achenes are shorter and broader, the pappus of more delicate bristles; last and not least of the differences being that herbage readily ferments and darkens in the drying, while the firmer and glaucescent *E. callianthemus* undergoes no such change.

The best specimens of *E. hesperocallis* before me are of my own collecting on Mount Rainier, 20 Aug., 1889. The plant grew copiously in a woodland opening with a marsh in the midst and a stream flowing through from the lake which is near the limit of trees on the west side. Both Mr. Howell and Mr. Suksdorf have often distributed the same plant, in less luxuriant form, from Mt. Hood in Oregon, and Mt. Adams in Washington. Mr. Gorman collected it in a smaller form at Crater Lake, on Mt. Pitt, in southern Oregon; this plant, however, departs from the type in having its basal leaves obtuse, also with a more or less hairy midvein. Again, and far away in northwestern Washington, in the Olympic Mountains, Mr. A. D. E. Elmer (n. 2623) obtained a form, or ally, of the present species with leaves basal and cauline equally narrow and acute, and glabrous except as to a rather conspicuous white-villous ciliation. Yet again, in the Wenatchee Mountains, away in the northern interior of the same State, the same Mr. Elmer has (n. 447) another ally with the normally very acute, and in drying blackened foliage, but the whole herbage cinereous with a fine soft pubescence. Future exploration of the vast Northwest, on both sides of the British boundary, will be likely to form my *E. hesperocallis* as here circumscribed an aggregate.

I must not advance beyond this point in the discussion of the *E. salsuginosus* medley of the books without adverting to, and critically examining the fine plate, purporting to represent Richardson's *Aster salsuginosus* published in the Botanical Magazine for the year 1829, t. 2942. Viewed superficially, and without study of the text, and the circumstances under which the plant represented was grown in Scotland, the beautiful plate has been a stumbling block. Looked at discriminatingly, no plant that I know of, whether of the United States or of British North America, comes anywhere near answering to that fine figure. The whole plant is represented, therefore with the full complement of leaves basal and middle and upper cauline, in all 13 leaves, of which all except the upper 4 are very distinctly, though rather remotely serrate. I have under inspection some 90 herbarium sheets, mostly very good specimens as to foliage, of plants of the West and Northwest which on Gray's authority were labelled *E. salsuginosus*, and not one of the 90 shows a hint of that serrature shown in the Bot. Mag. figure, not so much as one tooth of it. He who examines the plate sees that the whole plant—so very tall—had to be drawn in two sections. The section is made midway of the stem, and between leaves 9 and 10, counting from the base. It is in the least degree disconcerting that all the 9 leaves of the lower part of the plant are well serrated, the 4 belonging to the upper section are all at once perfectly entire. It suggests a query as to whether the two sections in the figure may not have been founded on parts of two different plants. The suggestion comes to myself with all the more forcefulness because of the fact that the 9 leaves of the lower section, not only by their serratures but by their whole outline—if that were all—are those of the plant familiar to me as my own *E. Drummondii*, which was derived from the selfsame part of British America whence the seeds from which this Bot. Mag. *salsuginosus* was grown. I am far from saying or thinking that said plate is thus fictitious. I do not believe that it is. However much like those of *E. Drummondii* in outline and indentation, they are shown to be glabrous. Those of *Drum-*

mondii are hoarily hirsute. Also the figure could not have been made, as a whole, from the last named species, for the rays in *Drummondii* are perhaps twenty times as numerous and almost as narrow as threads. I have a settled opinion that this plate labelled *Aster salsuginosus* presents a species not yet named and published, and which awaits rediscovery somewhere among the mountains of those great broad provinces of British Columbia or Alberta; as also the real original *salsuginosus* of the "salt plains of the Athabasca" awaits rediscovery.

We owe gratitude to Sir William Hooker's memory for his having published that fine daisy that flourished in the Glasgow Garden more than 80 years ago, and shall excuse him for having guessed that the mountaineer beauty of southwestern Canada would be the same as Richardson's of the far northern alkaline plains. Our later synantherologists have all been quite as inconsiderate; to not one of whom does it seem to have occurred that if the *salsuginosus* of high northern interior salt plains had ever made its way to Colorado, Wyoming and Utah, men would have found it on the alkaline or salt plains that are remote from the subalpine sweet-watered meadows and brooksides where alone *E. callianthemus* is ever seen. In respect to the Pacific coast species, *membranaceus*, *hesperocallis* and their kindred, the like is true. Not one of them is of the concourse of those plants which inhabit saline or alkaline lowlands. Every one is of elevated and pure-watered marshes or brooksides, or other moist alluvial grounds.

Restricted to the Pacific slope, and ranging from British Columbia to southern California, each in its own physiographic region, are several other species of this broad-rayed group which I proceed to name and characterize.

Erigeron loratus. Allied to *E. callianthemus*, but main foliage from basal part of plant extremely narrow, erect, and greatly elongated, 2 to 9 inches long, the lance-linear blades less than ½ inch wide, tapering to an almost equally long petiolar part, cauline leaves 2 inches long or less, lanceolate,

acute, sessile, all foliage deep-green, entire, pubescent marginally and more or less so along the veins, but stems quite strigulose; heads not of the largest, but solitary; bracts of involucre very many, linear, acuminate, their slender tips recurved, all green as to color, not darkened, neither granular nor viscid but rather strongly scaberulous; rays purplish, decidedly broad, but less so than in *E. callianthemus*.

Known only as collected near the international boundary, in the Chilliwack Valley, in July, 1901, by J. M. Macoun, the type specimens in my own herbarium, bearing the Canad. Surv. numbers 24,468 and 26,467.

ERIGERON CILIOLATUS. Low tufted perennial, the branched caudex stout, copiously leafy, the leaves ascending or upright, the few flowering stems—one only to each branch of the caudex—only 2 to 4 inches high, stoutish, decumbent, beset with reduced and bract-like foliage, strictly monocephalous, all foliage glabrous except marginally, of the blue-green of *E. callianthemus*, not altered by the process of drying; basal leaves 1 to 1¾ inches long, spatulate oblong and very obtuse, to lance-oblong and acutish, peculiarly ciliate for this alliance, with a considerable length and density of hirsutulous hairs: bracts of the involucre devoid of pubescence and glandular, dark-colored, almost uniserial and equal, the tips little spreading; rays broad, about 35, nearly or quite white.

From 7,500 feet on Mt. Rainier, collected 14 Aug., 1895, by O. D. Allen (n. 142), and distributed for *E. salsuginosus*.

ERIGERON SUKSDORFII. Rhizomatous subterranean parts strongly developed and very stout; stem and tuft of basal leaves solitary at each branch of the caudex and the scapiform stem monocephalous; herbage firm, glaucous, not in the least discolored in drying: basal leaves upright, ¾ to 2½ inches long, the earliest spatulate-oblong, very obtuse, others lanceolate, acute, all entire, shortly and stiffly ciliolate, the hairs incurved; pubescence of stem strigulose, the hairs appressed: heads as large as in smallish states of *E. callianthemus*, the

involucral bracts much less numerous, glandular-scaberulous, not darkened but of the same green as the foliage, of firm texture and scarcely reflexed at tip: rays white.

At 5000 feet on Mt. Adams, Washington, 5 Aug., 1885, W. N. Suksdorf, his n. 2412 as in my herbarium; sent out by Mr. Suksdorf for *A. salsuginous*, but by him remarked on as different from the other *salsuginous* of lower altitudes on the same mountain, that is, *E. hesperocallis*. He notes that this smaller plant of greater elevations has white rays. He does not note that the herbage is different both as to color and texture, nor that this plant when dry remains colored as when fresh. I should have been glad if I could have left this to represent, on these higher elevations of coastward peaks, the Rocky Mountain *E. callianthemus* in a small form. That is what the specimens suggest, until you view the parts under a lens. It has characters precluding its referability to that or any other species.

Within the almost or quite 600 miles stretch of the Sierra Nevada of California nowhere exist the physiographic conditions that have been given the *E. hesperocallis* of Oregon and Washington, much less the environment of *E. callianthemus* of the far inland and more arid as well as colder Rocky Mountain chain. Yet plants of their type are more or less frequent throughout some 500 miles, at least, of the Sierra Nevada. It is a region—that of the higher elevations, where alone these plants are found—which has been little explored, but among the scanty material gathered, one notes here also a number of things long ago labelled *E. salsuginosus* which need not be looked for outside of this mountain range, and which are mostly without name or description. The earliest known California member which obtained a name as a variety is a plant of subalpine heights in the northern Sierra to which Asa Gray as long ago as 1876, while he still held these things to be asters, named *Aster salsuginosus* var. *angustifolius*. It is a well defined species and has been named in specific rank by

some one in more recent times; but southward in the middle and southerly extensions of these mountains there are evidences of species not yet named.

ERIGERON REGALIS. In size, form, even leaf-outline, mostly precisely imitative of *E. callianthemus*, yet as to texture and color of foliage widely different; leaves as thin as in *E. membranaceous*, yet not dark but light-green, at the same time with nothing of the glaucous or blue-green of *E. callianthemus*, the basal ones with blades elliptic and acute, tapering to long winged petioles, marginal pubescence scanty and unequal, that of the stem as scanty, fine, spreading or ascending: heads 2 or 3, very large; bracts of involucre more equal, broader, shorter, not much disposed to curve at tip, densely beset with minute gland-tipped strigose hairs; rays ample, apparently pale purplish or pinkish: achenes villous-strigulose.

This fine species was first collected by Bolander in 1866, in the Yosemite Valley, his n. 5029, according to the sheet now before me, and in Asa Gray's hand labelled *Aster salsuginosus*. More perfect specimens are those of Coville & Funston from Mineral King, n. 1409 of the Death Valley Exp., and the same with narrower foliage, also from Mineral King, is their n. 1472.

ERIGERON PETIOLARIS. Tufted perennial, with solitary monocephalous stem from each branch of the caudex, the whole 6 to 10 inches high; basal leaves quite erect, 1½ to 3 inches long, the broad winged petiolar part of from twice to four times as long as the somewhat obovate to oblanceolate laminar part, both faces as well as the stem hirsutulous with fuscous rather than whitish hairs, and the leaves somewhat viscid-glandular under the pubescence, cauline leaves very narrow, but both frequent and long, very erect, almost appressed to the stem: head short-peduncled, rather large, 1¼ inches wide from tip to tip of the broad blue rays; bracts of invol-

ucre subequal but in several series, their tips tapering, but not attenuate nor much recurved, dark-colored and glandular above the middle, but toward the base rather densely viscous-hirsute.

Such a peculiar member of the group is before me, from some not definitely indicated station in the mountains of middle California, at 10,000 feet, by George B. Grant, collected in July, 1902; type sheet of four specimens in U. S. Herb.

ERIGERON CONTROVERSUS. Evidently an alpine and sub-acaulescent perennial, each tuft of ample upright leaves and monocephalous scapiform stem arising from the branch of a stout multicipitous crown, the height only 1½ to 3½ inches; leaves 1 to 1¾ inches high, spatulate oblong, very obtuse, entire, glabrous except as to an obscurely ciliolate margin, the texture not firm; stem with 1 to 3 linear bracts and a solitary head large for the plant; involucre between turbinate and hemispherical, of not very numerous bracts and these notably unequal, rather firm, linear, acute, the tips neither erect nor yet definitely spreading, the whole dark-colored, glandular-puberulent, with also some strigose hairs: rays broad, well elongated, purple, about 25 in number.

An ambiguous species, known to me in a half-dozen specimens mounted on U. S. Herb. sheet 221514, collected by Mr. Marcus Jones in Aug., 1879, at Alta, Utah. Mr. Jones distributed this for an *Erigeron*, without any specific name. It is not easy to see why in 1879, before Asa Gray had transferred such things from *Aster* to *Erigeron*, he should not have received and distributed this plant for an aster. Perhaps the only slight inequality of the involucral bracts, and their glandular character, may have indicated erigeron, or, it may be that the labelling and distribution of the specimens was made after 1881, when Gray began to call such things erigerons and therefore in the light of that author's teaching. This dwarf is an erigeron only because *E. salsuginosus* and *callianthemus* are to be erigerons. If they are aster, so is this, and

the more because of the few and unequal bracts in *E. controversus*. This can not be the *Aster glacialis* of Nuttall, any more than can certain larger, yet smallish states of *E. callianthemus* can be that unrecognized plant.

There is another group of large and handsome western erigerons, even more showy in some of its developments than the salsuginosi, readily distinguished from the last named by the excessively numerous and extremely narrow rays; a group more numerous in species than the salsuginosi, and as much in need of critical investigation. The plants are particularly abundant at middle elevations in the Colorado mountains, sometimes descending to the foothills along stream banks, in moist alluvial soil. A multitude of diverse types in this group went altogether, in the days of Hall and Harbour's, Parrys and Patterson's and my own early gatherings in Colorado, as *E. glabellus* according to the dictum of Asa Gray, the *E. asper*, published by Nuttall together with his *E. glabellus*, being suppressed; not allowed even varietal rank. The validity as a species of this Grayian group that took in one set of plants from the high and dry plains of Dakota and Manitoba to moist and rich mountain valleys of British Columbia and southward all the way to New Mexico and Arizona remained long unquestioned. So long as I knew these beautiful things only as we have them in Colorado and Wyoming, I did not question the authority of Gray in the matter, or doubt that he was correct; and not until many years later, and after the period of my studies in Colorado had ended, did I discover the evident fallacy of the *E. glabellus* of the Synoptical Flora.

In the summer of 1890, on the unbroken prairie, sparsely grassy and somewhat sandy, at Carberry, Manitoba, I came upon several colonies of erigerons of species wholly new to me. I had not forgotten that it had been from somewhere in just this physiographic region, and not so very far to the south, that Nuttall had derived the originals of his *E. asper* and *glabellus*. I made a representation of the plants for my herbarium. On my return from that season's travels I could

have taken up my Colorado and Wyoming materials, and might easily have made the segregations—some of them at least—which this personal rediscovery of Nuttall's plants convinced me were called for.

Two years later than the date of my collecting these things in the southern part of Manitoba Mr. Rydberg, then unacquainted with the farther Rocky Mountain erigerons of such signal beauty, gathered the comparatively homely *E. glabellus*, though not in typical form, in the Black Hills of South Dakota. With something very like the real *glabellus*—specifically the same thing—before him, he was able afterwards, when the great richly colored Colorado mountain "*E. glabellus*" came to his knowledge, to segregate it, agreeably to its deserts, as a species. This he did, publishing the fine plant, however, under the poor plebeian name of *E. Smithii.*

I should be glad to be able to take up, at this juncture, the whole subject of Nuttall's *E. asper* along with *glabellus;* but the many scores of sheets of specimens at hand which have been so referred, as I think infelicitously, can not now be studied critically by me for want of time; but there exist in Colorado and other western mountains here and there some less common types of this alliance hitherto unpublished.

ERIGERON RUBICUNDUS. Habit of *E. Smithii* but a stout plant, and low, barely 6 inches high; basal leaves 1 inch long, spatulate-obovate, entire, very obtuse, the cauline oblong, acutish, broadest at base and sessile, quite numerous, over-reaching one another in their suberect attitude, all superficially glabrous except as showing some long hairs on the midvein beneath, the margins rather strongly hairy; stem stiffly short-hirsute throughout: involucral bracts in two equal series, hirsute below the middle, above somewhat strigulose, but with also a denser investiture that is glandular-scaberulous: rays 100 or more, deep-pink, or almost rose-color, not of the narrowest, the spread of them in the expanded head 1¼ inches.

Known to me only as collected in the extreme southwestern Colorado, near Silverton, July, 1889, by Alice Eastwood.

ERIGERON IODANTHUS. Mode of growth quite that of *E. Smithii* but rather small, the stems less than a foot high, tufted and at base decumbent, stoutish, loosely hirsutulous to above the middle, above that and to the peduncles more densely so, but the hairs finer and shorter, accompanied by a trace of sessile glands very minute: basal leaves long-petioled, the blades broadly oblanceolate, obtuse, the whole 2 or 3 inches long and with sparse hairiness as to both faces, the cauline oblong to lanceolate, sessile, acute, rather strongly ciliate, but superficially glabrous or nearly so: heads large, 2 or 3, the terminal one not surpassed or even equalled by the laterals; bracts of involucre linear, acuminate, equal, glandular-puberulent: rays many, not extremely narrow, in color of an intense blue-violet.

Collected at 10,500 feet on some mountain in southern Colorado, 9 Sept., 1903, by F. H. Knowlton.

ERIGERON HIRTUOSUS. Habit of *E. Smithii*, but only 5 or 6 inches high, the stem strongly hirsutulous from base to summit, all except the very earliest leaves hardly less so; lowest basal leaves spatulate-obovate, obtuse or even retuse, glabrous except marginally, and there showing only scattered short straight spreading hairs; stem leaves few, large for the plant, spatulate to oblong, acutish, broad at base and sessile: heads 2 or 3, large, their short peduncles very hirsute, the involucres glabrous except for a few hairs at the base, above it green and naked, though with the mere suggestion of a glandular coating: rays long and very narrow, deep-purple.

Collected in southern Wyoming, at 10,000 to 11,000 feet on the Continental Divide, 15 July, 1901, by Frank Tweedy.

ERIGERON MOGOLLONICUS. Stoutish and rigid, the several stems 12 to 16 inches high, erect above an ascending basal part,

these and tufts of larger leaves from a short branched crown or caudex, the leaves to all appearance glabrous, but not so the stem and long peduncles of the several large heads, these sparsely but rather coarsely setose-hispid and striate; basal leaves on short broad petioles, these and narrowly oval or spatulate-oblong blades 3 to 6 inches long, obtuse, entire; cauline leaves small, oblong, sessile, from 1 inch long in the lower to ¾ inch long in the upper, all glabrous except as to the rather strongly and stiffly ciliolate margins; heads corymbose, the hemispherical involucres little more than ¼ inch high, twice as broad, the bracts equal, linear, strigose-hispidulous and most so near the margin, not at all granular; rays narrow, not excessively numerous, nearly ½ inch long, apparently purplish.

Known to me only as collected in the Mogollon Mountains, New Mexico, by H. H. Rusby in 1881.

A natural group of rather tall and leafy, mostly white-rayed erigenus, of which *E. Coulteri* is an old and a good representative, has yet not a few unrecognized species; among them the following, from Oregon.

ERIGERON NEMOPHILUS. Large perennial, with stems stoutish, simple and monocephalous, 1½ feet high, with a copious investiture of large stem leaves; basal foliage of an elliptic-lanceolate blade and narrow petiole of nearly equal length, the whole 3 inches long or more, entire, very acute, the cauline almost as large, but sessile, broadly lanceolate, with 1 to 3 salient serrate teeth on each margin, the texture of all very thin, unaltered as to the deep-green color in drying, both faces sparsely hairy, the margins closely beset with very different short incurved hairs; stems sparsely hirsute below, more thinly soft-strigose above the middle; head very large, the narrow and equal involucral bracts soft-hirsute at and near the base, otherwise green and glabrous, with hardly a perceptible trace of the glandular: rays numerous, not so extremely narrow, apparently light rose-red.

A fine and strongly marked species apparently collected only by Mr. E. I. Applegate somewhere in southern Oregon, 29 July, 1898. For the particulars of the locality, I may well quote the words of Mr. Applegate: "Moist ground at edge of woods west of Abbott's Butte, on boundary line between Jackson and Douglas counties, about 6000 feet."

Erigeron leucanthemoides. Tall as the last; more strictly erect, monocephalous, the stem as leafy; basal leaves not present, the cauline mostly 3 or 4 inches long, with a spatulate tapering from an oval and obtusish proper laminal part, this lightly and even somewhat obscurely serrate-toothed, the texture of all very thin, darkened or discolored in drying, both faces with some scattered hairs, but the margin without any; stem nearly glabrous thoughout, the few hairs soft and spreading: heads large, the spread of the not very narrow white rays nearly 2 inches; bracts of involucre in 2 series but equal, shortly soft-hirsute almost throughout, but the hairs shorter and more sparse above the middle.

Collected in the Powder River Mountains, Oregon, in August, 1896, by C. V. Piper, by him labelled *E. Coulteri*, to which it is not very closely allied. The breadth of the long white rays is almost that of those of the ox-eye daisy.

Erigeron lucidus. Stems more than a foot high, rather slender, strictly erect and monocephalous from slender nearly horizontal rootstocks; basal leaves small, 1½ to 2½ inches long including the elliptic to oblanceolate blade and broad petiole, the lower basal twice or thrice as large, mostly spatulate and spatulate-oblanceolate, sessile, acute, the upper half of the stem with only few and reduced acute narrow leaves, the pedunculiform uppermost part naked for 3 or 4 inches under the solitary large head; stem straw-colored, very smooth, glabrous to the naked eye, a good lens disclosing here and there a white-bristly short ascending hair; leaves of a bright light green, of thinnest texture, glabrous except margin-

ally, even there only obscurely pubescent: involucre before pressure perhaps low-hemispherical, nearly ½ inch high, at the very base marked by a tuft of hirsute deflexed white hairs, the bracts all equal and hardly biserial, linear, acuminate, from below the middle up the apex rough with scattered blackish hairs but neither glandular nor viscid; expanded head 1¼ inches across, the rays white, neither narrow as in typical erigeron, nor anywhere nearly as wide as in *E. callianthemus.*

Type specimens in U. S. Herb., collected in Idaho, between Custer and Challis, by L. F. Henderson in 1896.

ERIGERON SCABERULUS. Akin to *E. glabellus*, the simple monocephalous stems strictly erect from the very base, a foot high or more, minutely hispid-hirsute throughout, this indument deflexed on the lower part of the stem, elsewhere only horizontally spreading; leaves numerous, but small for the plant, the basal not 2 inches long, oblanceolate, acutish, entire, of firm texture and upright, the cauline less than an inch long, lance-oblong, acute, erect, sessile, both faces of all foliage setulose-scabrous, the margins closely and stiffly ciliolate: involucre hemispherical, more than ½ inch broad, the bracts equal, linear, merely acute at tip, the whole series glandular-scaberulous and closely so, without hairiness; rays very many and narrow, but short for the involucre, the spread of them hardly 1¼ inches.

White Mountains of Arizona, David Griffiths, August, 1903; type sheet in U. S. Herb., sheet 496640.

Several new allies of *E. divergens*, chiefly far southeastern, are next presented.

ERIGERON GRACILLIMUS. Root annual, stem strictly erect, simple to near the summit, 10 to 15 inches high: earliest foliage unknown, leaves nearest the base cuneate-obovate, narrowly so, the others spatulate-linear, all entire, acutish, ½ to

¾ inch long, greenish, thinly somewhat strigulose-hairy, the few pedunculiform and monocephalous branches minutely and more densely hispidulous under a lens: involucre about 4 lines broad, not as high, its bracts biserial but equal, the inner linear-lanceolate, aristate-acuminate, the outer linear, loosely hispid-hirsute: spread of the numerous violet or paler rays about ¾ inch: bristles of the pappus very delicate and fragile, the squamellae present, as in the whole group.

Common on stony slopes, in forests of yellow pine, in the Coconino Forest Reservation, northern Arizona, the specimens collected 24 Aug., 1911, by Jardine & Hill, who give 6800 feet as the altitude of the woodlands where it grows. On U. S. Herb., sheet 326788 are four good specimens of the same, distributed from the same general region, collected by M. E. Jones, 17 Sept., 1894. The special locality given for these is Nagle's Ranch.

Erigeron furcatus. Annual or biennial, rigidly erect, 6 to 10 inches high, simple to the middle, there producing a solitary short-peduncled head, and beyond that widely and several times forked, the whole cinereous with a short strigose-hirsute indument: absolutely basal foliage unknown, the lowest cauline 1½ inches long and suberect, consisting of oblanceolate blade and narrow petiole of equal length; those of upper part of stem 1 inch long, linear, obtuse, numerous, the pedunculiform flowering branches similarly bracted to within a half-inch of the head; bracts of involucre only sparsely hirsute, the inner series shorter than the outer, all acute; rays many, narrow, long, white: outer pappus conspicuous, of rather many broadly subulate squamellae.

The type is from the region of the San Francisco Mountains in northern Arizona, as collected by F. H. Knowlton, 20 Aug., 1889, the special locality Hendrick's Park. No other member of the group has a stem simple up to the height of three or four inches, then once or twice or thrice forked.

Erigeron lavandulaceus. Low perennial, the not numerous branches basal, at first decumbent, then ascending, the whole 5 to 7 inches high and cinereous with a dense and rather soft strigose indument: leaves rather firm, the basal seldom an inch long, of rounded entire blade and well defined petiole of equal length, those next above cuneate-obovate, the proper cauline and rameal oblong-oblanceolate, abruptly acutish; pedunculiform monocephalous branches naked for 2 inches or more: heads of the usual size for the group; involucres rather broad and low, sparsely hirsute, the bracts very many, equal, merely acute; rays excessively numerous and narrow, not long, of a fine lavender-blue: pappus bristles very delicate, the squamellae minute or obsolete.

Gardenville, Nevada, 15 June, 1902, C. F. Baker, his n. 1085, distributed as *E. divergens*. With its deep lavender rays and graceful habit, this is one of the few members of its group that may be called beautiful.

Erigeron dicladus. Perennial but with perfectly simple caudex producing annually 2 or sometimes 3 wand like stems a foot high or less, these very slender and monocephalous, the branchlets all leafy, sterile, curving outwards; whole plant pale with a dense pubescence which under a lens is wholly hispidulous: basal leaves gone at flowering time, only their dilated, hispidulous and ciliate petiolar part remaining; cauline oblanceolate, but narrowly so, and an inch long, those of the branchlets much reduced and linear, the long pedunculiform ends of the branches naked; heads of the size usual in the group; involucral bracts equal and biserial, except as to several much shorter which subtend the rest, the pubescence not dense, hispid-hirsute: rays white: receptacle almost flat: outer pappus of the achenes not scanty but minute, apparently slender-subulate.

Collected at 6600 feet in the mountains near Kingston, New Mexico, 9 June, 1904, by O. B. Metcalfe, wrongly referred by me to *E. cinereus*. Though the few branches are

rigid and ascending, there is still a suggestion of *E. flagellaris* in its aspect.

The present study must be concluded by diagnoses of species belonging to various groups of the membership of the genus.

ERIGERON VILLOSULUS. Stems tufted, 3 to 6 inches high, very leafy to the summit with a foliage large for the plant, mostly monocephalous, the heads short-peduncled, hardly surpassing the foliage; leaves of lower part of stem oblanceolate, more or less definitely broad-petiolate, the others lance-oblong and sessile, all entire, acute or at least acutish, from 2½ inches long in the lowest to 1½ in the uppermost, all parts of leaf and stem, especially the stem, almost hoarily villous-hirsute; involucre ½ inch broad, its bracts equal, biserial, the outer series strigose, the inner glabrous; rays very narrow, not excessively numerous, deep violet-purple, the head with these expanded an inch across.

Grassy summit of Mt. Angeles, western Washington, at 6000 feet, J. B. Flett, 12 Aug. 1911. A member of the leafy stemmed group to which *E. macranthus* and *speciosus* belong, but a dwarf subalpine, almost wooly-looking plant.

ERIGERON ANICULARUM. Low perennial with one or more subscapiform assurgent or ascending stems 6 inches long, arising out of a tuft of upright lanceolate basal leaves 1 to 2½ inches long, entire, or some with a few serrate teeth, these and the few lance-linear stem leaves of a pale green, also subcinereous with a fine short strigose pubescence; heads 1 or 2, of middle size, the involucres hemispherical, ½ inch wide when pressed; bracts rather broadly linear, not only acute, naked and very thin at tip but mainly strigulose-hairy, with traces of minute glandular dots where the pubescence is thinnest: rays rather short, numerous, narrow, white.

Collected on Old Wives' Creek, Assiniboia, 23 May, 1895, by Prof. John Macoun, n. 10850 of Canad. Geol. Survey.

Var. LATIUSCULUS. Pubescence and heads as in the type, but monocephalous stems stout, rigidly erect, only 3 inches high; the tuft of basal leaves large in proportion, broader, often very obtuse.

This is from Twelve Mile Lake, Wood Mountain, in the same province, and by the same collector. Its number is 10,894 of the Canad. Geol. Surv.

ERIGERON PACHYRHIZUS. Low multicipitous subalpine perennial, with something of the aspect of *E. leiomerus* as to the parts above ground, but these tufted on the branches of a thick woody-looking caudex, such branches ascending, or nearly horizontal, dark with imbricated leaf-bases of many seasons: 1½ to 3 inches long, oblanceolate to spatulate-olong, very obtuse, entire, of thin texture and bright green, sparsely beset both superficially and marginally with setiform hairs, or some of the lowest glabrous; stems several, subscapiform, 3 to 5 inches high, decumbent, bristly-hairy, usually monocephalous, and with a few sessile small leaves; involucre rather narrow and subturbinate, its bracts almost uniserial, rather few and broadly linear, acute, sparingly setulose; rays short and broad, perhaps white.

Calapooia Mountains, Oregon, "on a bare peak, about a mile west of the Cascade divide," Coville & Applegate, 9 Aug., 1897. Interesting plant, with some affinity for *E. leiomerus*, yet doubtless also with points of contact with alpine diminutives of *E. callianthemus*. The color of the herbage is unaltered by drying.

ERIGERON EUCEPHALOIDES. Stems several, a foot high or more, from a subligneous caudex crowning a thick hard root or rootstock, loosely and rather equably leafy to the summit, the bark whitish, smooth, glabrous, only the peduncles of the 1 to 3 heads scabrous-hispid; leaves all everywhere glabrous except as to the distinctly scabrous-ciliate margins, the basal upright on long slender petioles, these and the narrowly

oblanceolate acute blades 3 or 4 inches long, the cauline all sessile, but the lower spatulate-lanceolate, the others oblong to ovate-lanceolate, 1½ to 2½ inches long and sessile by a broad half-clasping base: heads much smaller than in others of the *macranthi*, 1 to 3 on naked rigid peduncles, the receptacles under the bracts strongly muricate-scabrous, the bracts rigid, subulate-linear, their slender tips recurved, strongly scaberulous; rays not elongated nor so very numerous, but rather broad, of a deep violet-color: achenes strigulose, pappus fine and fragile.

South shore of Pettit Lake, Idaho, collected 14 Aug., 1895, by Dr. B. W. Evermann of the U. S. Fish Commission, who describes the habitat as a morainic ridge, at an altitude of 7200 feet or more. The species is strongly marked, and has something of the aspect of *Eucephalus glaucus*.

ERIGERON APICULATUS. Plant 2 feet high or less, in habit between the *macranthi* and the *glabelli*, having a strongly developed tuft of basal petiolate leaves, the stem being copiously and equably leafy with broad sessile ones, all the foliage thinnish, wholly glabrous except marginally, and even there faintly if at all ciliate; basal leaves upright, 3 to 6 inches long including the broadly lanceolate and lightly serrate blade and the broad petiole, the cauline about 1½ inches long, ovate-lanceolate or narrower, entire, but all leaves both basal and upper tipped abruptly with a long almost aristiform mucro: heads about 4, corymbose, long-peduncled, among the largest; involucres nearly hemispherical, in the pressed specimens 1 inch across, the bracts linear, equal, in about 3 series and, like the peduncles below them, finely and closely glandular-scaberulous, the outside of the receptacle beneath the bracts hirsutulous with short deflexed hairs; rays many, long, the spread of them about 1¾ inches, broader than those of other *macranthi*.

Known only as collected in 1874, at 9000 feet, on Mt. Graham, Arizona, by J. T. Rothrock.

ERIGERON LEIOPHYLLUS. Akin to *E. macranthus*, stout and rigid, 2 feet high, the stem perfectly glabrous, whitish and somewhat polished, closely leafy to the monocephalous or subcorymbose summit; basal leaves if any unseen, the lower cauline 2 or 3 inches long, broadly oblanceolate to spatulate, these succeeded by oval ones of 1½ inches or more, those nearer the summit gradually shorter and, the uppermost ovate and ½ to ¾ inch long, the lower and larger obtuse, the small uppermost acute, all very smooth and glabrous on both faces, only the margins scaberulous with short upturned bristly hairs: heads 1 to 5, small for the plant; bracts of the involucre linear, acute, glabrous, under a lens showing faint traces of minute granular indument.

Collected at Fort Douglas, Utah, 17 July, 1886, by Marcus E. Jones, the very good type sheet of four stems being n. 221417, U. S. Herb.

ERIGERON CONGESTUS. Low perennial, with taproot crowned by a closely compacted system of short and stout branches bearing tufted upright leaves and many scapiform monocephalous branches. The whole plant only 3 or 4 inches high, every part almost hoarily strigose-hirsute: leaves oblanceolate, obtuse, entire, an inch high or little more; scape-like branches with few and inconspicuous narrow bract-like leaves and simply hirsute with long white hairs: involucre hemispherical, the bracts linear, acute, very hirsute with stiffish, even somewhat strigose hairs like those of the leaves; head less than ½ inch high, more than ½ inch broad, rayless, the flowers deep-yellow: achenes flattened, minutely strigulose; pappus double, the inner very slender and fragile.

Gold Hill, in Bear Valley of the San Bernardino Mountains, southern California, at 7000 feet, S. B. Parish, 2 June, 1901; both habitally, and as to pubescence completely distinct from *E. aphanactis*, which also does not reach this region.

Certain Cruciferous Types.

POLYCTENIUM is here proposed as a generic name for a type which only by most superficial inspection, joined to a total disregard of vegetative characters, has found place in books and herbaria under the name of *Smelowskia Fremontii*. To the eye of experience there is not a suggestion here of the genus *Smelowskia*, which are not only soft-wooly herbs, but their herbage is soft as to texture, that is, it is yielding or pliable, whereas in *Polyctenium* it is in every part rigid, wiry as to the stems, and as to the leaves stiffly acerose, almost prickly; also the basal and subterranean parts are as different as imaginable. Of the branched caudex, its members deeply invested with the soft-chaffy leaf-bases, which one notes universally in *Smelowskia*, there is no trace in *Polyctenium*. So strong is the contrast between the two that when the latter first came to my knowledge, and I thought it a plant undescribed, I referred it to *Braya* and published it as *B. pectinata*. If any one had pretended to assure me that the plant was a *Smelowskia* I should have been heedless of the proposition. I have never been able to appreciate that now time-honored artificialism in botany that ignores vegetative and habital characteristics. But the pods even in this plant have not always been looked into with due discrimination. They have been described as linear and tetragonal; but while their angularity is obscure, their more distinctive mark is that they are definitely, though in the type species but slightly, obcompressed. Measured transversely to the partition they are wider than the partition itself, a character which comes out strongly in a species never until now published. The original of the genus is frequent in southern Oregon, particularly in the Klamath Lake country, and southward into northern California. I call it

POLYCTENIUM FREMONTII.

POLYCTENIUM GLABELLUM. Larger than *P. Fremontii*, quite devoid of distinctively basal pectinate foliage, and the plant almost glabrous, only few and scattered short and mostly

simple stiff hairs visible under a lens: leaves neither very rigid nor pungent, sessile along the branches and appearing almost digitate by their 4 or 5 long and linear segments: racemes larger but flowers smaller than in the type species, and white: pods unknown.

Known only as collected by Mr. J. B. Leiberg on Dry Creek, Malheur Co., Oregon, 27 May, 1896. The locality is in extreme eastern Oregon, remote from the range of *P. Fremontii*.

POLYCTENIUM BISULCATUM. In habit quite like *P. Fremontii*, with a similarly dense tuft of acerosely dissected basal leaves, but the plant smaller, also quite cinereous with a copious but very minute and short dendritic pubescence, this extending to the pedicels: siliques short, only 3 or 4 lines long, linear-oblong, strongly obcompressed, each valve sunken into a shallow furrow on either side of the midvein.

Collected so far only by Thomas Howell, in Silvies' Valley, of the Blue Mountains, Oregon, 24 May, 1885. Readily distinguished by its dense pubescence and short, much flattened and bisulcate pods. The plant is also small, the most perfect specimens less than 3 inches high.

PLANODES is a generic name well suited to a cruciferous type which for more than two centuries past, under the leadership of a number of systematists, has wandered from one genus to another, at home nowhere, until one admit it as *sui generis*. The most unnatural place ever assigned it by any one, is that which it is forced into in recent manuals, where it is called *Arabis virginica*. There is not a group or subgenus of arabis species into which it falls. To put it next the cresses, where Plukenet had it more than two centuries ago, is not at all as bad taxonomy as to call it an arabis. Linnaeus, who knew the type only from Plukenet's figure of a very young plant, could see in it nothing else but a *Cardamine*, and, altering that author's *Virginianum*, named it *Cardamine Virginica*. No one, having an eye to habital resemblances, and

ignorant of the ripe pods and seeds of the plant, could possibly make a better disposal of it. But the one character essential to the very existence of *Cardamine* as a recognized genus is extreme elasticity of the valves of the pod when mature. That which lacks the essential character of a genus, must not be forced into such genus; and I call this type

PLANODES VIRGINICUM.

New Species of Chaenactis.

CHAENACTIS LEUCOPSIS. Subalpine or alpine low perennial, the many stems, buried for half their length in sand or scorial, arising from a more deeply seated root, their aerial part consisting of a tuft of leaves and a scapiform monocephalous stem, itself barely 2 inches high and little surpassing the leaves, the whole herbage even to the tips of the involucral bracts whitened with a fine close altogether wooly indument: leaves of stout petiole and pinnate blade of about equal length, the pinnae approximate and themselves pinnate-lobed all except the lowest, and the minute lobes short and rounded: heads ¾ inch high, about as broad, the bracts subequal, the outer, lance-linear, the others linear, none quite acute: rays none: achenes hirsute; pappus of about 8 subequal paleae, all obtuse, purple in the middle.

Type specimens in U. S. Herb. from an altitude of 11,500 feet in the Needle Mountains in southwestern Colorado, 14 July, 1901, Whitman Cross, collector. Completely separate from other alpine species by its purely wooly indument, without trace of separate hairs or any glands; its habit also rather characteristic.

CHAENACTIS PUMILA. Alpine or subalpine dwarf perennial with its several branches wholly above ground, clustered on the crown of a long deep root, the whole plant above ground only 2 to 3½ inches high, but the breadth of the mass of heads sometimes 4 inches; blades of the leaves ovate, often

broadly so, from less than ½ to more than ¾ inch long, on broad flat petioles of more than equal length, the petioles and rachis densely white wooly at first, this partly deciduous, the pinnae approximate, sometimes more than once pinnate: scapiform peduncles barely surpassing the leaves, sometimes corymbosely branched and with 3 heads, other plants monocephalous, these and the involucres strongly glandular-scabrous and viscid, never in the least either wooly or hirsute: achenes fairly hispid rather than hirsute; pappus short.

Species of the Sierra Nevada of California exclusively, the type Brewer's 1901 from Sonora Pass, at about 11,500 feet. The heads of flowers in this stout dwarf are as large as those of the largest species.

CHAENACTIS IMBRICATA. Suffrutescent and tall, the many upright branches stout, somewhat tortuous, sparsely leafy up to the corymbose summit; all parts except the floral hoary with a thinnish flocculent tomentum; blades of the leaves of ovate or lance-ovate outline, bipinnate, the primary pinnae remote, their segments crowded, very small and rounded: heads 1 to 5 terminating the branches, ¾ inch high; bracts of the involucre very notably unequal, forming about 3 series, all viscid-hirsutulous, not tomentose: achenes strongly strigose-pubescent; pappus paleae elongated but unequally so, very thin and delicate.

Known only from Wenatche Flat, Washington, where it was collected in 1899, June 4, by Kirk Whited. Quite as nearly shrubby as the Californian *C. suffrutescens,* but most unlike that in all other characters.

CHAENACTIS RUBELLA. Dwarf perennial, the whole aerial part of the plant only 1 to 1½ inches high, the proper stems much longer, but leafless and as if buried under sand or scoriae, thus apparently springing severally from a single taproot: leaves many, ½ inch long or little more, ovate, obtuse, closely pinnate and the pinnae pinnatifid, the segments mi-

nute and round, the whole leaf floccose-tomentose when young, later more or less glabrate: scapes only ½ inch long, the heads as high; involucral bracts broad and obtuse, thinly wooly, with barely, or hardly, a trace of glandulosity; corollas deep purple, as are also stems, leaves, and even the pappus; achenes quite hirsute, scales of pappus unequal, on the whole rather short, very obtuse.

A fine subalpine species known only as collected by Dr. J. N. Rose somewhere in northwestern Wyoming, probably on what is now Yellowstone Park territory, 31 Aug., 1893.

CHAENACTIS MINUSCULA. Dwarf, and also slender, the tufts of small leaves only an inch high, the scapiform peduncles and solitary heads together barely 2 inches, even less, all these, in the specimens, crowning stoutish caudex-branches dark-colored and covered with the persistent bases of the leaves of other seasons, the root bearing these not known: leaves from broadly lanceolate to narrowly oblong outline, the pinnae approximate and mostly entire, the whole floccose-tomentose only when young, the older glabrate: involucres ½ inch high, their bracts green or purplish, glandular-scabrous or some glandular-hirtellous, yet not very viscid: achenes rather strongly bristly-hairy; pappus purple, its scales obtuse, not very unequal.

Summit of Mount Parks, Idaho, at an altitude of 9400 to 10,400 feet, collected by Dr. B. W. Evermann, 15 Aug., 1895.

CHAENACTIS ANGUSTIFOLIA. Low perennial, with caudex simple or sparingly branched, the leafy and corymbose stems only 2 to 7 inches high, all the parts except the involucre and flowers white with a close permanent tomentum, both basal and cauline leaves long and narrow, in outline narrowly lanceolate to broadly linear, the pinnae closely approximate and very short, either with 3 rounded short lobes or else quite entire, the petiole manifest, but much shorter than the blade:

involucres subturbinate, more than ½ inch high, bracts narrow below, broader and obtuse above, light-green, notably hirsutulous with jointed and viscid hairs: achenes with a conspicuous indument of stiff short strongly ascending hairs; paleae of the pappus very unequal, some of the outer very short, the innermost greatly elongated.

Point of Rocks, Wyoming, in dry soil, collected by E. D. Merrill and E. N. Wilcox, 19 June, 1901. Specimens in U. S. Herb.

CHAENACTIS EVERMANNII. A low much branched and decumbent undershrub, the branches rather slender, wiry, hard-woody and tortuous, those of former seasons naked, dark-brown, those of the season an inch or two long, closely leafy, monocephalous, the small head on a short and slender peduncle: leaves only ½ to ¾ inch long, some tridentate and tapering cuneately to a short petiole, others between pedately and pinnately 5-cleft or lobed, the lobes oblong, obtuse, entire, the leaf as a whole white-tomentose on both faces when young, glabrate in age: involucre small, turbinate, far shorter than the flowers, of few and unequal bracts, all wholly herbaceous and very obtuse, thinly tomentose: achenes densely, even somewhat silkily, appressed-pubescent; pappus of about 8 unequal thin obtuse scales.

Collected on a mountain in Idaho, in 1895, by Dr. B. W. Evermann.

CHAENACTIS BRACHIATA. Perennial with stout lignescent basal branching and the dimensions of the northern and genuine *C. achilleifolia*, but basal leaves as well as cauline many times smaller, more fleshy and very compact as well as permanently white-tomentose, the closely pinnate blades ovate to oval, only ¾ to 1 inch long on stout petioles of equal or greater length: stems a foot high or more, whitened with wool when young, the wool only partly persistent later, the 3 or 4 monocephalous branches brachiate, *i. e.* abruptly divergent from the main stem at first, then holding the heads erect

by a curve, the whole summit corymbose: heads ¾ inch high, turbinate; bracts linear-oblong, very obtuse, pale-green, roughened with short papillose gland-tipped and viscid hairs: some of the outer achenes glabrous, others like the inner sparsely short-bristly; paleae of the pappus very unequal.

Springdale, Utah, M. E. Jones, 17 May, 1894. Species strongly marked in many ways, the foliage comparable to that of *Tanacetum crispum* in cut, but many times smaller, and white with wool.

CHAENACTIS CHEILANTHOIDES. Suffrutescent, producing densely leafy sterile branches 6 inches high, and flowering ones of a foot or more, these also amply leafy below the corymbose inflorescence; leaves tripinnate, 3 or 4 inches long, 1 inch wide, the ultimate segments all minute and rounded, the whole leaf open and fern-like after the manner of common species of *Cheilanthes*, quite white with a dense wooly indument when young and growing, later glabrate and greenish: corymb of 8 to 12 turbinate heads nearly ¾ inch high, on slender pedicels, these and the involucres thinly villous-tomentulose and minutely pellucid-glandular, the bracts subequal, lance-linear, obtuse; flowers of twice the length of the involucre, flesh-purple, glabrous; achenes villous-hirsute and pellucid-glandular.

Fayette River, Idaho, at 4100 feet on dry sandy slopes, collected 15 Sept., 1911, by D. Parkinson. The foliage of the plant is of signal beauty, fine, lace-like, ample, snow-white when young, pale in maturity.

Miscellaneous Specific Types.—V.

CLEMATIS ALTHEIFOLIA. Habit and inflorescence of *C. ligusticifolia*, but the plant more slender and graceful, all the parts notably smaller: leaves of sterile shoots 5 or 6 inches long, of 7 to 9 remote small leaflets, these 1 to 1½ inches long, of somewhat rhombic-ovate outline, with a notable

acumination, commonly with a few coarse teeth, often with a prominent lobe on one side at the base, texture very firm, both faces minutely and thinly appressed-pubescent; leaves of fertile branches quite similar, but with only 3 to 5 leaflets and surpassed by the cymes of smallish white flowers: sepals of pistillate flowers 5 or 6, spatulate-obovate to oblanceolate, reflexed and rather persistent, softly silky: stamens of such pistillate flowers 5 to 10, with flattened filaments either linear or slightly lanceolate-dilated, anthers manifest, but perhaps effete; staminate plant unknown: achenes silky-plumose to above the middle, nearly naked for some distance below the apex.

Species known only as collected by myself in the half desert hills near Golconda, in northwestern Nevada, 27 July, 1896.

POLYCODIUM OLIGANTHUM. Shrub apparently low, the branches short, slender, widely spreading, or some recurved, thinly hirsutulous with whitish hairs, some spreading, others turned upward: leaves subcoriaceous, small, the largest only 1 inch long, oval, acutish, glaucous beneath, scarcely glaucescent above, also with scattered hairs near the margin and on the very short petioles: flowers scattered singly in the axils of the ordinary foliage: corolla rather ample and deeply lobed: stamens short: fruit small, globose, conspicuously crowned by the triangularly lobed calyx.

Known only as collected at Lemon Bay, Florida, 23 May, 1906, by S. M. Tracy; his n. 7264. A fine new member of that Floridan group that has no distinct and separate inflorescence.

POLYCODIUM LANGLOISII. Branches slender, minutely and sparsely pubescent with short curved hairs, the pubescence permanent, at least during several seasons: leaves ample, thin, deep-green and almost alike as to color on both faces, pubescent along the veins on both faces, of oval-elliptic outline, 2½ to 3½ inches long, 1½ to 1¾ inches wide, subses-

sile, narrower below the middle, yet ending abruptly and usually subcordate at base, the apex very acute: bracts of the short racemes small, oval, obtuse, rather strongly ciliate under a lens: corolla extremely short yet apparently mature: fruit unknown.

Species very distinct by the foliage; known only as collected by the late Rev. A. B. Langlois, at Covington, Louisiana, 16 April, 1894.

MACHAERANTHERA SCOPARIA. Annual or biennial, less than a foot high, much branched from the base, and fastigiately, the slender but rigid branches forming a rather dense broomy-bushy tuft: basal and early leaves unseen, those of the branches linear, entire, acute, ascending, hardly an inch long, subcinereous with a minute and rather dense strigulose pubescence, the branches greener, their scanty pubescence more tomentulose: heads many, at summit of the plant only, some of the main branches 3-parted, with as many heads, others simple and monocephalous: involucres ½ inch high, subcampanulate, their bracts not excessively numerous, the tips appressed and straight, not pungently acute, whitish at the back with a minute villous-tomentose pubescence; rays 20 or more, rather short, violet.

Plant of open grassy woodlands, northwest of Turkey Tanks, on the Coconino Forest Reservation in northern Arizona; the specimens collected by Jardine and Hill, 26 Aug., 1911. The species may be compared with my *M. linearis* of southern New Mexico, from which it differs as well by its much less imbricated involucres, and by its pubescence, as by its low bushy habit.

SENECIO MESADENIA. Perennial, the solitary stem stoutish, erect, 2 feet high, subumbellate-corymbose at the almost naked summit, below the middle very sparsely villous-lanate: leaves almost all basal, the longest a foot long including the very long petiole, the blade only 4 or 5 inches, the petioles like the stem below villous-lanate, the blades oval-elliptic, very

saliently and rather closely dentate and minutely and obscurely villous-ciliolate, otherwise glabrous except as to the midvein beneath and next the petiole: corymb of about 12 heads ½ inch high, the terminal one largest and sessile, subturbinate, at least under pressure; bracts of involucre linear-oblong but abruptly apiculate, the very tip of the apiculation purple, the whole otherwise light-green, glabrous; rays rather short but broad, oblong, light yellow.

Collected somewhere on the Mono Forest Reservation, California, at 6600 feet, 1 July, 1911, by Charles W. Fulton. I name the species in reference to the likeness the plant bears to certain species of the genus *Mesadenia*.

SENECIO FODINARUM. Robust perennial 1½ feet high, rather amply leafy to the middle, the basal leaves not the largest, 2 or 3 inches long, ovate, with short and broad petiole, those next above on the stem twice as long, spatulately tapering from an oval upper part, those midway of the stem as long but spatulate-oblong, all entire, obtuse, almost veinless, arachnoid-wooly marginally, otherwise nearly glabrous; heads 12 to 16 in a broad compact corymb, each head nearly ¾ inch high; bracts of involucre oblong, abruptly acutish, more or less villous-arachnoid along the prominent midnerve; rays short and broad, yellow.

Near Mineral King in the Sierra Nevada of California, Aug., 1891, Coville and Funston, Death Valley Exp. n. 1491.

Certain Asclepiads.

Time was, and not very long since, when in all our books the commonest milkweed, or silkweed of our northern States and Canada bore the Latin designation, *Asclepias Cornuti*. It passes by that name in works as recent as Gray's Synoptical Flora (1878) and even in the sixth edition of his Manual (1890). Only in the course of the very last years of the nineteenth century, and under the influence of new ideas as to the inviolability of the principle of absolute Linnæan priority, was the old but very erroneous and misleading name *A. Syriaca* restored; the name given it by Linnæus, who himself never had the remotest suspicion that his plant was at all American, not to say exclusively such, and never seen in Syria at all.

As early as 1844, and while as yet the best botanists held that falsehood must not be propagated in the name of science by even so much as a falsifying adjective plant name. The principle is rational and sound. There are amateur botanists, collectors of specimens, and makers of herbaria, both in this country and in Europe, where now our plant has long since become naturalized, who have never supposed for a moment that the species is not a native of Asia, introduced here. The name itself tells that lie to all such people; and every one of these may justly charge us with disseminating untruth, and what we know to be an untruth, by using that as the legitimate name of this common milkweed.

But now, what is of quite special interest in this connection is, that even Decaisne's name for the species, the name *T. Cornuti*, is false as well as the other, though in a different way; for any one possessing a botanist's trained eye, accustomed to, and at all familiar with our milkweeds, opening at page 90 of Cornut's volume, discovers even at first glance that what is there figured, so far from being the *A. Syriaca* of Linnæus, is really the *A. obtusifolia* of Michaux. The solitary, strictly terminal, pedunculate umbel with its few-flowered laxity, as also the small foliage, dispute its identity with the more com-

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mon large-leaved plant whose umbels are always several, always lateral and almost subsessile. Moreover, in that old author's full page of description, in which he covers everything from root to pods, there is not a syllable that points to the wooly-leaved and spinous-podded *A. Syriaca*. The man could not have written that description with any specimen of the species last named before him.

Several generations of botanists, including our many Americans of the profession, since Decaisne's time, yes, even from Linnæus down, have trustingly followed Linnæus and Decaisne in citing Cornut's figure as a sort of prototype—by all of them an unquestioned prototype—of *A. Syriaca*. One is obliged to doubt whether even one of them, after Linnæus, ever took a look at that old seventeenth-century page and figure to see for himself what it might represent.

Concerning the two names, *A. Syriaca* and *A. Cornuti*, it may not seem to every mind impertinent to ask which one is likely to become the settled one for the species, and perpetual for all coming botanical time? It is possible that neither one may forever escape universal reduction to the status of synonymy; for, *tempora mutantur*. The first of the two prevailed from 1752 to 1844, though rejected by some who would have no geographic botanical names at all. From 1844 until almost 1900 *T. Cornuti* held sway; for only as late as 1908 did that old standard, Gray's Manual, return to *A. Syriaca*; so that only within the last five years has that appellation met with what may be called universal adoption among us. Times change, and so do minds. How long the opinion may prevail that names stand by priority, even when false or ridiculous, no one can tell; but it might easily be that forty years hence, or twice or thrice forty, a distant generation may think as some of the best and boldest individuals between Linnæus and us have thought, that all false names and foolish ones must be expunged, and better ones substituted for them. In that day both *A. Syriaca* and *A. Cornuti* will both go by the board.

The following new members of the genus are from regions distant and western:

ASCLEPIAS LONCHOPHYLLA. Stems 1 or 2 from the root, stout, suberect, low, only 7 to 9 inches high, densely leafy from near the base to the summit, there producing 1 or 2 ample subsessile umbels; leaves rather broadly lanceolate, 2 inches long or somewhat more, abruptly mucronate-acute, on stout short petioles of less than ¼ inch, firm, equally lightish green and sparingly pubescent on both faces: flowers about ⅓ inch long, dull purplish green; hoods subquadrate-oval, obtuse, the horn stout, incurved, not very acute.

Plant of the San Francisco Mountain floral district in northern Arizona, where it is doubtless a rarity, having been collected by only one among the many botanists who have visited the region, namely, by C. A. Purpus, in 1902. In his distribution of specimens it was called *A. Hallii*. It is indeed related to that quite rare species of Colorado and Utah, though it is as nearly allied to *A. pratensis* of Mexico, with which it agrees as to its reduced dimensions. It is upright, however, while the Mexican ally is decumbent; this also has few and opposite leaves, while *A. lonchophylla* has them fairly crowded on the stem, also mostly alternate. It is also notably pubescent, whereas *A. pratensis* is glabrous, or with but a few traces of pubescence.

ASCLEPIAS DEMISSA. Allied to *A. erosa*, but low, only 8 or 10 inches high, firmly erect, densely leafy with small foliage, the herbage glaucous and slightly hoary: leaves ovate-lanceolate, little exceeding an inch in length and a half-inch in width, truncate at base, or nearly so, and sessile, strongly ascending in pairs, the apex subfalcate-cuspidate: flowers in several subterminal short-peduncled umbels, the individual flower large for the plant; hoods short, far from equalling the anthers, subtruncate, the inner process broadly crescent shaped, far exserted, short-pointed.

An interesting plant, purporting to have been collected

somewhere in Arizona in 1875, by Dr. Loew. The two specimens are on U. S. Herb. sheet 18,727. It was at first labelled "*A. erosa.*" That was afterwards (?) erased and "*A. vestita*" substituted, this appellation also subsequently erased, all by parties unknown. The small size of the plants, and peculiarly small and dense foliage, preclude our referring it to either of those species, not to speak of the flowers, the hoods of which, while too short by half for those of *A. erosa*, have the pattern of those of that species in all but their great brevity. In this one particular only do they at first glance suggest *A. vestita*; in structure, and as to the horn, they are far from it.

Asclepias Rothrockii. Allied to *A. erosa*, half as large, more slender, canescently tomentulose: leaves oblong-oval, 2½ to 4 inches long, subsessile, cordate at base, at apex abruptly and cuspidately acute: umbels subsessile, their peduncles barely ½ inch long: hoods of the flower white, shorter than the anthers, as broad as high, truncate and subcampanulate, the broadly lunate process much exserted, not very acute, not horizontal over the anthers, but ascending.

Collected by J. T. Rothrock, on Wheeler's Expedition of 1875, apparently at Fort Tejon, southern California. The foliage has neither the size nor the form of that of *T. erosa* from the same region. It is of thinner texture, also. That of *T. erosa*, even from southern California, is almost coriaceous, the leaf ovate in outline, modified by a long acuminate apex, and the breadth of the leaf is greater than the greatest length of that of *T. Rothrockii*.

Asclepias obtusata. Of the size of *A. erosa*, but with soft-hoary and thin flaccid foliage; leaf outline elongate-oval, short-petioled and not cordate at base, the apex in all but the floral leaves very obtuse, even subtruncate, but always with a small mucronation, length of leaf 3½ inches, the breadth 2 inches, the texture quite thin: hoods exactly truncate, about equalling the anthers, their process with a long point horizontally extended.

This, like the preceding, was collected by Rothrock, his label says at Fort Tejon; but most probably that collector's localities for plants are untrustworthy. As far as Dr. Gray's description of his *A. erosa* var. *obtusa* goes, this plant agrees with it; but he testifies that Rothrock obtained the plant at Bartlett's Cañon near Santa Barbara, and that is not only far removed from Fort Tejon, but is in an extremely different climatic region. This plant, then, is from near the ocean, and within the fog belt. The thinness of the texture was not noted by Dr. Gray. The closet botanist is apt to fail in this. The distinction of the hood, as truncate squarely, not obliquely, Gray took note of.

Some New Lupines.

LUPINUS OVINUS. Low cespitose perennial, the branches of the caudex thick, short, slightly woody, the scapiform peduncle with flowers only 3 or 4 inches high, the raceme of about 3 or 4 verticils borne little above the foliage: leaflets about 7, ¾ inch long or less, oblanceolate, acute, both faces glossy with a dense appressed silky-villous indument, this extending to the pedicels and calyx; corolla ⅓ inch long, deep blue-purple, wings perceptibly larger than the banner, keel slightly exserted beyond the wings, uncommonly stout and straight, sparsely ciliate at about the middle; pods ¾ inch long, densely silky-tomentose, several-seeded.

Sheep Mountain, Waterton Lake, Alberta, collected in July, 1895, by Mr. John Macoun, the specimens with Geol. Surv. n. 10,413.

LUPINUS YUKONENSIS. Tall and slender perennial, with ample long-stalked foliage and no branches, and a solitary rather short raceme of large flowers: petioles 7 or 8 inches long, erect, the leaflets 5 or 6, nearly elliptical, 2½ inches long, ¾ inch wide, thinnish, slightly glaucescent above and

glabrous beneath, showing few and scattered pilose hairs on the veins and a more copious yet not at all dense coat of somewhat appressed shorter hairs, the stem also pilose, and with also a short closely appressed pubescence; rachis of the raceme, and more especially the pedicels, hirtellous-hairy; flowers in 6 or 8 not indistinct verticils; calyx thin, scarcely gibbous at base, upper lip notched, the whole villous hirsute on and near the margin: corolla blue-purple, about ½ inch long, the breadth a little more, banner and wings about equal, keel becoming longer, strongly falcate, naked; ovary densely villous-hirsute.

Klondike River, Yukon, John Macoun, 9 July, 1902.

LUPINUS PAULINUS. Herbaceous low perennial, with long slender taproot and a multicipitous short-branched crown, the numerous scapiform peduncles 4 to 7 inches high including the raceme, this compact, 2 to 3 inches long and quite surpassing all the foliage: leaves notably small for the plant, and of few leaflets, the usual number 6, none of more, not a few of 5 and even 4, cuneate-oblong, ½ inch long more or less, barely acute, deep-green, densely appressed-pilose beneath, the upper face less densely so and with shorter hairs, all subfuscous; rachis of the raceme only thinly setulose-hairy; flowers mostly in distinct and approximate verticils; calyx more pilose, its short and subtruncate upper lip partly hyaline; corolla dark purple, less than ⅓ inch long, the banner uncommonly short and wings large, keel enclosed within the wings, short and little curved, scantily wooly-hairy above the middle: pods not seen.

Collected at Paulina Lake in the interior of Oregon east of the Cascades, 28 July, 1894, by J. B. Leiberg; his n. 550 as in U. S. Herb.

LUPINUS FRAXINETORUM. Perennial, with the habit of *L. formosus* and *Bridgesii*, the several stems weak at base and decumbent, devoid of distinctively basal or radical leaves, but though leafless at the very base, freely and equably leafy above

it and up to the single and terminal raceme, rather conspicuously villous-hirsute with long hairs either horizontally spreading or somewhat deflexed, the short slender petioles similarly hairy, these at base subtended by a pair of large oblong or narrowly oval herbaceous stipules entirely free from the petioles and from each other, ½ inch long or more and acute; leaflets about 7, oblong-oblanceolate, 1 inch long or less, acute, canescent on both faces with a dense appressed short-silkiness; raceme subsessile, 5 to 7 inches long, the rachis, pedicels and calyx short-silky-villous; flowers rather definitely verticellate, the whorls not at all crowded; corolla about ½ inch long, dull bluish and white, the banner shorter than the wings, the long keel falcate, naked.

Specimens from an altitude of 6800 feet in the Californian Sierra, on the Sequoia Forest Reservation in Fresno County. Collected by Mr. Ralph Hopping, 29 June, 1911. The species is a remarkable one among Californian perennial lupines on account of its large herbaceous free stipules. The specific name is but an adaptation of the geographic name Fresno, which Latinized is Fraxinus.

Lupinus habrocomus. Perennial with very leafy stems 2 feet high or more, strongly striate-angled and notably brittle rather than flexible, clothed with a rather copious but very fine and soft-spreading pubescence, bearing at summit a single short-peduncled and rather lax raceme of large flowers: basal leaves not seen, those of the stem midway and upwards large, on ascending petioles of 2 inches or more, and with subulate-lanceolate hyaline very villous stipules; leaflets about 8, almost lanceolate, tapering almost equally from near the middle to each end, 2 inches long or more, very thin, quite green despite a not very sparse indument of very fine appressed hairs which only along the margins, and the midvein beneath, becomes dense, forming a silvery-villous line: rachis of raceme, as also the pedicels, villous-hirsutulous; calyx almost hyaline, purplish like the petals, yet appressed-villous; length of the very broadly oval wing petals ½ inch, the banner notably

shorter; keel rather narrowly falcate, sparsely curled-hairy from above the middle: pods unknown.

Cochetopa Forest Reservation, middle southern Colorado, growing in aspen groves at 8500 feet in the mountains, gathered by E. F. Clark, 6 July, 1911. The plant when dry is so fragile that the specimens have reached me only in fragments, but they show the marks of a rather peculiar species in several ways, as already indicated.

LUPINUS HILLII. Perennial, the rather slender but rigid stems several, 1 to 1½ feet high, bearing 1 to 3 racemes at summit, otherwise simple, purplish underneath a certain hoariness of short dense villous pubescence interspersed with a few long white hirsute hairs; absolutely basal foliage apparently wanting, those of the main stem on slender but firm petioles of 2 to 3 inches, purplish and pubescent; leaflets 5 to 8, cuneate-oblong, very obtuse, 1 inch long, the largest ⅓ inch wide near the summit, not very densely silky-strigose on both faces, less so above: racemes short-peduncled, 3 inches long, rather lax, the blue-purple flowers very small, more or less definitely verticillate; corolla only, or scarcely, 4 lines long, the banner shorter than the wings, the keel shorter than either, not falcate, strongly ciliate from base almost to apex: pods short, rather lightly silky-villous, mostly 3-seeded, but not a few 2-seeded only.

This exceedingly well-marked lupine was collected on the Coconino Forest Reservation in northern Arizona, 29 June, 1911, by Mr. R. R. Hill, who reports it common in open thinly grassy groves of yellow pine. The flowers are the smallest known among those of perennial lupines.

New Species of Cicuta.

CICUTA FRONDOSA. *C. occidentalis* f. *frondosa*, Greene, Pitt. ii. 7. In the long interval that has passed since I discovered this plant, and made public mention of some of its character-

istics, the specimens have lain in my herbarium without further notice. That I was at first willing to locate it under the Rocky Mountain *C. occidentalis* was partly because, not knowing its fruit, I preferred not to accord it specific rank on vegetative characters alone. Nevertheless the best, and often the only characters for hundreds of species in a multitude of genera, are the vegetative; and the marks attributed to this Californian water hemlock at the first, are properly specific. The difference between a glaucous plant and one without bloom is a specific difference. The stems are not only taller but stouter than in the very largest *C. occidentalis*. Finally the consideration of its habitat, as of the Pacific slope, and completely sundered from the environment of the plant of Colorado and Wyoming—this argues for it specific rank; and the more conclusively since the discovery of *C. grandifolia* of northern Arizona, a species which occupies, geographically, a middle place between the habitat of *C. occidentalis* and the Californian species.

Cicuta subfalcata. Roots 8 to 12, thickish and fleshy, 3 or 4 inches long, terete or slenderly fusiform, whorled around the basal part of the strictly erect and closely partitioned subterranean section of the stem, this hardly an inch high; stem proper only 2 or 3 feet high and slender, upright, not much branched, bearing at summit about 3 smallish umbels: leaves ternate, or some only bipinnate, the leaflets large for the plant, 3 or 4 inches long, narrowly lanceolate, subfalcate, closely and saliently serrate-toothed, of a vivid green on both faces, without trace of bloom and glabrous; flowers small, white; fruit unknown.

From the Gallatin National Forest in southern Montana, where it is reported as growing in wet places, at an altitude of 5000 feet. The specimens were gathered by some one in the forestry service there, 29 August, 1911.

Cicuta Dakotica. Basal and underground parts not seen, but plant evidently tall and robust, freely and widely branched

above: leaflets large, 3 to 4 inches long, ¾ inch wide, acuminate at apex, at base acute, somewhat remotely and not deeply serrate, the serratures almost spinescently acute, neither face of leaflet notably veiny: umbels many: fruits rather large, oval-elliptic, marked superficially by more than usually narrow ribs and broad intervals in cross section showing thin curved-linear dorsal and large triangular lateral ribs; oil-tubes large and deep, impressed into the seed, rendering the periphery of the seed sinuous.

Collected on grounds of the college farm, at Brookings, South Dakota, in 1893, by J. J. Thornber. Type in U. S. Herb. Evidently a more robust and widely branched plant than *C. maculata*, the leaflets several times larger, and the fruit of marked character.

CICUTA ARGUTA. Subterranean and closely partitioned part of stem so shortened as to be almost obsolete, the fascicle of roots therefore proceeding from just below the surface of the ground, these 6 or more, large and fleshy, nearly terete, 4 inches long or more, ⅓ inch thick: leaves small for the plant and very compact, only 8 inches long beyond the petiole, of some 80 leaflets and biternate; leaflets 2 inches long or less, narrowly lanceolate, closely, deeply and acutely serrate from base to apex, the short veins running to the tips of the serratures very prominent beneath: fruit short, rounded, nearly as broad as long; ribs thick and broad, the intervals narrow, as seen in cross section the dorsals oblong-oval, the laterals of more than twice their size and gibbous-oval; oil-tubes not impressed.

Type sheet in U. S. Herb. from Forest City, South Dakota, 3 Sept., 1892, by Griffiths and Schlosser.

CICUTA VALIDA. Stature of the plant and its underground parts not known: lowest leaf 2 feet long including the very stout and apparently turgid or inflated petiole, this more than ½ inch thick, the lamina a foot long, 10 inches across below

the middle, of rhombic-ovate outline, the leaflets large, few and rather remote, 31 in number, in five primary pinnae, the first and second being compound, each of 10 leaflets, the third compound and of 6 leaflets, the fourth and fifth simple, each being of a pair of large subsessile leaflets; terminal leaflets exactly ovate, acute, obtuse at base, about 2½ inches long exclusive of the petiolule, strongly but not at all deeply serrate, the teeth short and broad, but mucronately acute, lateral leaflets somewhat smaller, quite tapering to the short stout petiolule, but the tapering inequilateral: upper part of stem remarkably stout and somewhat fistulous, bearing 3 large umbels, the pedicels likewise very stout and rigid: fruits suborbicular but distinctly broader than high; corky ribs prominent, in cross section narrowly oval, the laterals of about four times the dimensions of the dorsal.

Eastern slope of the Sierra Nevada of California, in Mono County, collected very long ago by Bolander, and, if distributed by him at all, probably under the name of *C. maculata*; indeed this is "*C. maculata*" of the Botany of the State Survey, at least as to the plant from Mono Pass; the southern plant so referred being very likely my *C. frondosa*. The fruits of *C. valida* are small for so large a plant, and are not very satisfactorily designated as suborbicular. They might almost as well be described as transversely short-oval. The species is particularly well marked in character. I do not know how it came to escape the notice of Messrs. Coulter and Rose.

Cicuta Sonnei. Plant 3 to 5 feet high and not stout, with subterranean parts much as in *C. occidentalis*, *i. e.* of large fusiform roots, but stems purplish and glaucous, remotely leafy and the foliage small; basal leaves smallest of all, only 4 to 6 inches long, the middle cauline twice as large, all consisting of about 29 leaflets each, 1 to 1½ inches long, lance-elliptic, very acute at both ends and remotely and slightly serrate-toothed except at the cuneately tapering base, those of the small basal leaves broader, shorter and at base obtuse: umbels few: fruits small, the corky wings low, very broad,

almost meeting over the oil-tubes, all oblong as seen in cross section, the laterals more than twice the size of the others.

The habitat of this, as to the type specimens, is the eastern base of the middle Californian Sierra in California and adjacent western Nevada. The specimens are those collected by Mr. Sonne, at Truckee in 1892, and by myself at the same place in 1895. Mr. Heller has also distributed the same (n. 7174) from Truckee, but neglecting the underground parts, and calling his specimens *C. vagans*, wrongly, through following the guess of Coulter and Rose. Neither the underground parts nor the carpels in *C. Sonnei* are at all as in *C. vagans*.

CICUTA FIMBRIATA. Radical leaf large, bipinnate, of somewhat triangular circumscription, being a foot long, exclusive of the long petiole, and 9 inches wide near the base, the leaflets large and few, about 39 to 41, ovate-lanceolate, acute at both ends, about 2½ inches long by 1 to 1¼ inches wide below the middle, everywhere, except at the entire and tapering base, closely, deeply and thereby fimbriately serrate, the serratures slender, acute, but somewhat unequal; both faces of the leaflet of a vivid green, the lower very conspicuously veiny with elevated and sharp feather veins.

Saline or brackish marshes of Washington near the sea, where it was collected in 1854 or 1855 by Dr. J. G. Cooper, in whose catalogue (Pac. R. R. Rep., vol. xii, Book ii, p. 63) it is thus mentioned: *Conium maculatum*, Linn. "Large form of the northwest coast." (T.) Abundant everywhere in wet grounds, the large variety mostly near the sea, 8 feet high.

The words in quotation marks are those of Dr. Torrey. The determination of the specimen was made by him for Dr. Cooper, as the latter affirms. The name *Conium maculatum* was surely a slip of Dr. Torrey's pen for *Cicuta maculata*; for we can not possibly suppose him to have failed to distinguish between the leaves of *Conium* and *Cicuta*. The fact that in either case the specific name was *maculata* would have its tendency to induce such a lapse in writing.

CICUTA AMPLA. Subterranean parts not seen, neither even the basal or lower cauline leaves; leaflets of the uppermost, and not far below the umbels ovate-lanceolate, 3 to 3½ inches long, nearly 1½ inches wide toward the base, coarsely but very evenly crenate-serrate, the serratures very broad and short, but very abruptly acute, both faces deep green, the lower marked with elevated feather veins corresponding to the serratures: branches and peduncles rather slender, glaucescent: fruits large, elongated, of oval-elliptic outline, narrowed at summit to a distinct short neck, the 3 dorsal ribs elevated and narrow, hardly broader than the intervals, in cross section oblong, but the 2 laterals five times larger and equilaterally triangular, almost acutely so.

This remarkably distinct new cicuta is known to me only in the fruiting summit of a single plant, with good fruits and upper leaves, which was taken from somewhere near the Michigan Agricultural College at Lansing, 8 Oct., 1891, by the late Prof. C. F. Wheeler. Of such pronounced characters both of foliage, as far as we know it, and especially of the fruit, one naturally longs to know what its radical leaves and its subterranean parts are like.

Earlier History of our Dogbanes.—I.

In that old folio of the year 1565 entitled Hortus Regius Parisiensis, at page 22, occurs this expression of the name and characteristics of a dogbane: Apocynum Indicum foliis Androsaemi majoris flore Lilii convallium suaverubentis. This, if so turned into English as to be rightly understood will read: "An American Apocynum with leaves like those of *Hypericum androsaemum*, and flowers like those of the reddish variety of the lily of the valley."

This, in the folio of Joncquet, is the earliest account I have met with of any American dogbane. By the terms of Jonc-

quet's phrase the plant is not so certainly of American derivation. *Indicum* might indicate either the West or the East Indies; but, within ten years from the time of the publication of Joncquet's book, it appears to have been ascertained that the plant, whatever it was, had come from America; and what is more important, it had been seen in the Paris garden, and studied and very well written up by an Italian botanist of high distinction, by name Paulo Boccone, to whom, by the way, seems to belong the credit of having first figured plants from dried specimens affixed to herbarium sheets. Boccone, in his book, Icones et Descriptiones Rariorum Plantarum (1674), published nine years later than Joncquet's folio, reports having seen the plant growing copiously in the Paris Royal Garden, and gives a rather full and enlightening account of it, besides the figure of a twig of it, which twig it is likely he took for that purpose while in Paris. The name which he assigns it is quite altered from that by Joncquet. It is now Apocynum Canadense foliis Androsaemi majoris. It appears to have been ascertained that Joncquet's term *Indicum* was false, and *Canadense* takes its place in the name. The description by which Boccone follows up his amended and corrected name for the type is too long to be given here both in the Latin original and in translation, and I shall present his little chapter only in what would be the equivalent English wording of it: "This plant, as remarkable for rarity as elegance, stands up like a little tree. The stem to the height of a foot or more is without joint or leaf, and reddish, above this being divided into a multitude of branches. Leaves in pairs, rounded and closely resembling those of the greater androsaemum, attached by petioles, adorn the whole head. From the very extremities of these stems there proceed in a branched arrangement little flowers, pinkish tinged with purple, cup-shaped like those of the lily of the valley, or the strawberry-tree; to which there succeed pods narrower than those of asclepias, having within a white wool, and flat seeds of a reddish-brown color. The roots, spreading far and wide under the ground, are extremely tenacious of life and often send up their shoots

in the midst of the beaten paths of the garden. It is full of a milky juice which exudes from any part of the plant that is wounded. It is destructive of flies, if they alight on the flowers. At Paris, in the Royal Garden, it may be seen in abundance."

With such fulness as this were the best botanists of the generation preceding that of Tournefort accustomed to describe new plants; but for the botanists of the time there was much more in this description of the new dogbane than most of us of to-day will be able to get out of it without some very careful looking into it. Indeed there are hordes of botanists in several countries to whom Boccone's account of the foliage of his new plant will be meaningless, and therefore, to them, no description at all. Yet his phrase "leaves of the larger androsaemum" has in it all of the following: leaves ovate, entire, two or three inches long, firm, deep or dark green and glabrous, spreading away from the stem on little or no petiole. Now the plant *Androsaemum officinale*—called *Hyperiicum androsaemum* by Linnaeus—was very familiar to botanists of southern Europe, and that phrase told distinctly to all that the new apocynum suggested by its foliage and general bearing the familiar androsaemum. And we of the present age, if we know the hypericaceous plant androsaemum, can assure ourselves that Boccone's dogbane, whatever it may have been, was not *A. cannabinum*, because that has not an ovate foliage. Its leaves do not spread away from the stem, but are ascending, and are of a color that is in strong contrast to that of androsaemum. Of course when it is said of the flowers that they are like those of the pinkish or reddish lily of the valley, it becomes if possible still more certain that he had some member of that group of which Linnaeus *A. androsaemifolium* is the type. Is this plant of the old Paris Garden—the plant of Joncquet and of Boccone—the *A. androsaemifolium* of Linnaeus and of later North American botany? That can not be answered by any simple Yes or No. In reality the question is twofold. Let us simplify by asking: Is it the *A. androsaemifolium* of Linnaeus? This may be answered unhesitatingly in

the affirmative. His very name for the species he took from the descriptive phrases of Joncquet, Boccone and Morison. Thus did he most positively and unmistakably identify his plant with theirs. It were perhaps better not to say "his plant," for really Linnaeus had no plant of it either alive or dead and dry. He knew it only by the accounts given of it by those earlier authors; so it may be more accurate to say that he took out of their texts their own descriptive phrase *foliis androsaemi*, and made it a specific name for their species.

Now comes the other question. Is that plant—the plant of Linnaeus, as we may say—the same which we American botanists of the nineteenth century were taught by all our masters, to call by that name *A. androsaemifolium?* The facts give to this a negative answer. Our masters, the whole succession of them for a hundred years, were wrong in what they instructed us to receive for that species. That I was the first to call attention to this matter, and to propose names for things wrongly called *A. androsaemifolium* in our books is a condition under which I may without presumption tell what the plant was like which I, mistaught, and during a half-century of botanical observation, received as the *A. androsaemifolium* of Linnaeus. Its distinctive marks were, and are, a rather small number of pinkish or purplish nodding bell-shaped flowers inserted by short stalklets in the axils of the two, or even three, uppermost pairs of leaves of the plant, with also a somewhat more numerous short bunch of them at the summit of the branch. They were not at all numerous, and the aggregate of the flowers in the axillary clusters was greater than the aggregate of those in the one terminal cluster. In brief, the little inflorescences were axillary and terminal, the flowers beautiful but few. Apocynums answering that description as to their manner of flowering I was familiar with very long ago in New England, and later on the woodland borders of far-western prairies; and every man who pretended to know plants, and every book of botany that was available said this was *A. androsaemifolium* Linn. Almost every book assigned that species the mark of "flowers lateral and terminal" or

else "terminal and lateral." I cite briefly rather a long line of the masters who give the species that character: Michaux (1803), Pursh (1814), Bigelow (1814, 1817, 1824), Elliott (1821), Torrey (1824), Darlington (1826, 1837, 1853), Rafinesque (1828), Eaton & Wright (1840), Darby (1855), A. Wood, in all his editions, Chapman (1860).

The long while I was in error as to the identity of the aforesaid dogbane, I was so by reason of my unwavering faith in the authorities; and they were all wrong. If we now turn to Linnaeus, who, as they all say, gave that name to that plant, we learn that his plant had only terminal flowers; and it is not alone his brief diagnosis which so affirms. The figures, both of Boccone and of Morison which he cites, present a plant with decidedly numerous flowers, all in a terminal cymose panicle. To their plant both of them applied the descriptive phrase *foliis androsaemi*, and Linnaeus did no more than adopt that as a name for the selfsame type. I have no evidence that Linnaeus ever saw so much as a dried specimen or fragment of the plant; and all that he says about it he may have taken out of Boccone and Morison, whom he cites as the authorities on it.

At the time of this writing there are several species of dogbane known which have pink or purplish flowers all in strictly terminal cymes. The best of them belong to the far off western side of the Continent, and were therefore unknown until late in the nineteenth century. There are, however, indications of the existence here at the East of two or three which will more or less nearly answer to the real *androsaemifolium* of Joncquet, Boccone, Morison and Linnaeus; but before proceeding to such, let us take note of one of those graver misrepresentations of that species which at one time and another have appeared in books.

I should much like to see such a plant as that which Jacob Bigelow more than ninety years ago, in his admirable Medical Botany, figured for *A. androsaemifolium*. It departs widely from the anciently published and true thing in two important particulars if not in three. Its flowers, however well at agree-

ment with those of the real species of that name as to size, form and color of the corolla, are distributed in the main to axillary cymes. The whole number of flowers which the plate shows is 25, of which 7 are in the terminal cyme, the 18 belonging to 3 lateral ones; so that the whole number of the flowers is distributed about as equally as possible among four cymes mostly axillary. Considering that in plant species generally characteristics of inflorescence are more stable than those of the flower itself, and seeing that the whole accepted system of the Apocynaceae—quite as in the case of each of a hundred other families—would fall back into chaos should inflorescences cease, as we may say, to be sworn by, we are forced to deny to this plant of Bigelow a place among possible mere variations of *A. androsaemifolium*. But in the second place I remark that the foliage of his plant is about as far as can be from answering to that of the species aforesaid. So far from being ovate, the leaves are nearly lanceolate and quite slenderly acuminate. There is in them no suggestion whatever of the foliage of androsaemum; so that to no plant at all like this could the specific phrase *foliis androsaemi* have been applied. By characters of foliage alone, the plant figured by Bigelow is something apart, not only from real *A. androsaemifolium*, but from every other member of the genus known to me. Moreover, by the dimensions attributed to it by Bigelow it is again a stranger to us, for he reports that it "grows often to the height of five or six feet, though its common elevation is three or four." Plants that are commonly received by the botanists of to-day for *A. androsaemifolium*, having truly ovate and mostly obtuse leaves, if ever found two feet high, are accounted very tall specimens, and many little exceed one and a half feet; and all these have more axillary than terminal cymes, and are rather few-flowered. Unless the plant of Bigelow was in his day limited to the environs of the lesser Boston of a hundred years ago, and is now extinct, it should fall to the lot of some Massachusetts botanist to discover it anew, and give it a name, and a place in the list of northeastern dogbanes.

Not so far removed from what must be the typical *A. androsaemifolium* is a plant which, a dozen or fifteen years earlier than the work of Bigelow, had been figured and described under that same name in Curtis' Botanical Magazine, t. 280, and with an instructive account of the origin of the subject from which the drawing was made. Some such plant, though not Curtis' type, had been known in English gardens for sixty or seventy years anterior to the publication of the plate in the Botanical Magazine. Philip Miller had given an account of it in the first edition of the Gardener's Dictionary (1731), and Morison had described and figured it thirty years earlier, though whether from the plant as grown in England or on the Continent I am unable to say; but presumably that early accession of it to English gardens had been derived either directly or mediately from the original stock in the Paris Garden. This plant of the early Botanical Magazine is of quite another origin, for, though Curtis takes it to be specifically the same thing, the specimens he had were grown in England from seed sent from the neighborhood of Halifax, N. S., at a date then—that is, in 1794—quite recent. This figure, perhaps the most life-like and beautiful that has hitherto been produced as representing an apocynum, is in all essentials like that of Boccone (1674) and of Morison (1699). It shows a plant of ovate and truly androsaemious foliage—true to that even as to the dark-green color—and what may well be called a terminal cymose panicle of flowers. True indeed, one of the four cymes is axillary to one of the leaves, yet that one is raised on a long peduncle and so made fairly a part of the panicle. All are borne away beyond the leaves. Within a period of 130 years between 1664 (Paris Gard.) and 1794, that which is the very type of *A. androsaemifolium* was in the gardens of Europe, often described, and three times figured. Then in the first half of the nineteenth century the same was excellently represented in the Herbier de l' Amateur (1829) and in the Belgique Horticole (1850).

As regards this particular American dogbane, by name the oldest of them all, the sum of the matter is this: that the

plants so well figured in European journals between 1794 and 1850, quite like that of Boccone of 1674, represent the real *A. androsaemifolium.* It is certain that the original of the 1794 figure was derived from Nova Scotia, and it is next to certain that the old Paris Garden plant came also from northeastern Canada. Moreover, the only plant which I in my extensive travels have met with to match that of the figures mentioned, I met with, and collected, in Nova Scotia; though I should almost expect to find it in extreme northern New England. But that different phase, common enough in southern New England and far westward, with few flowers, most of which are axillary to large leaves, not even the few terminal ones equalling the foliage—such plants, eastern and western, whether of one species or an aggregate of several, are, like that fine plant of Bigelow's plate, manifestly as species nameless and nondescript.

Some Californian Maples.

For those smallest-leaved maples of California which have hitherto been jumbled together under the name of *Acer macrophyllum*, that appellation, as to its import is most unfortunate. It does not apply. The genuine *A. macrophyllum*, belonging to the valley of the Columbia and regions northward more than southward, with its leaves commonly ten inches broad and long, and not rarely a foot across, and even more, does not seem to have place in California at all, in any one of California's many and distinct climatic and floral regions. It may perchance some day be found in unexplored districts northwestward in the State, and toward the sea; but most unlike that is every one of a number of its California allies, each more or less localized—quite as in California species of trees, shrubs and herbs are apt to be localized—for all but one are furnished with leaves that make no kind of approach to those of *A. macrophyllum* in size, and are as diverse in form

and indument as are the maples of the whole of Atlantic North America. Of this condition, and of the falsity of that name for any California maple I became very clearly apprehensive while still a resident of the State twenty years since, but only recently has my attention been called again to these Californian trees, and this time with far more copious material available than all that I had myself gathered in former years. The following new species are very clear; and there are indications of half as many more in the National Herbarium and in my own, of which the incompleteness of the material precludes the satisfactory establishment of the species.

ACER FLABELLATUM. Leaves on elongated petioles of 3 to 6 inches and large, 4 to 6 inches long, widest a little above the middle, there measuring 5½ to 7½ inches, the base absolutely truncate without the suggestion even of a sinus, cleft to the middle only, the 3 main lobes subquadrate-obovate, shortly and broadly lobed at summit, the sinuses very narrowly V-shaped, upper face deep-green aud sparsely muriculate, the lower showing very prominent veins and veinlets and everywhere glabrous except at the forking of the veins, there exhibiting a tuft of short hirsute hairs, but the margin unevenly hairy with softer hairs; samaras uncommonly divergent for the group, as well as narrow-winged, fully 2 inches long, the body shortly but stiffly bristly as well as tomentulose, the bristly hairs in shorter form and appressed extending to the whole wing, this ½ inch broad, its inner margin conspicuously undulate.

Known only as collected on the Wilkes Exploring Expedition more than seventy years since in "Northern California," according to Dr. Torrey, by whom the label was written for the sheet (U. S. Herb, n. 17953) before me. The leaves of this are large enough for those of *A. macrophyllum*, but in not one of the several scores of sheets of northwestern, *i. e.* Oregonian, Washingtonian and British Columbian "*A. macrophyllum*" at hand is there any approach made to the not indistinctly fan-shaped cut of the leaves of *A. flabellatum;* and

the divergence of the samaras is almost equally of a new species, and one strongly marked notwithstanding that the dimensions of the leaf are very great in comparison with other Californian species herein presented.

Acer coptophyllum. Leaves not large, commonly 3 or 4 inches long and 3½ to 5 inches wide below the middle, deeply parted into uncommonly narrow segments leaving very large and open broadly V-shaped sinuses, each of the 3 larger segments 3-lobed, and deeply so, just above the middle, the lobes triangular-lanceolate, forming narrow and acute secondary sinuses; upper face of leaf glaucescent-green, soft to the touch by a coat of short stiffish hairs all pointing backwards to the base of the leaf, the lower face strongly reticulate, all veins and veinlets setulose-pubescent, the ciliation quite pronounced: samaras very large for the foliage, few in the raceme, also unusually divergent, showing a broad sinus, 1¼ to 1¾ inches long, the wing ½ inch wide or more, almost softly setulose-pubescent, the body of the fruit scarcely at all bristly but obviously villous-tomentose.

The solitary but very fine specimen of this most excellent species has been in my herbarium (n. 11420) for more than a quarter of a century, having been sent me from some unmentioned special locality in Humboldt Co., as long ago as 1886, by C. C. Marshall, the same for whom I named *Ribes Marshallii*; and this new maple is quite as remarkable among members of its genus as that gooseberry is among its cognates. In selecting a name for it I have hesitated in making choice, for the character of the pubescence is quite as peculiar as is the open and much cut leaf-pattern.

Acer platypterum. Leaves 3 to 5 inches long, of about the same breadth in the middle, exactly truncate at base, cleft below the middle, the segments much widened above the middle, forming oblong sinuses sometimes quite closed above, the subquadrate-obovate segment itself 3-lobed and the middle lobe large and 3-toothed, upper face not soft to the touch, yet

quite setulose under a lens, the setulae pointing forwards, lower face more stiffly setulose, but on the veinlets only, the veins proper with spreading hirsute hairs along their sides at and near their bases: racemes long and large; samaras about 1¼ inches long, moderately divergent, but wings excessively widened, ¾ inch wide in the middle and over-lapping, glabrous or very nearly so, the body densely bristly, but almost at summit only, the tomentellous indument very scanty and obscure.

Known only in a very good sheet of specimens (U. S. Herb. 469326), brought from Round Valley, Mendocino Co., in 1897, by V. K. Chesnut. The leaves almost as much dissected as in the last species, but very differently so, the segments even almost closing the sinuses. The wings of the samaras are the broadest known in the genus.

ACER AURITUM. Leaves pale and glaucescent above, there setose along the midvein and veinlets, the general surface rather closely muriculate, many of the points minutely bristle-tipped, the lower face, at least in full maturity, of a yellowish or subfuscous green and more sparsely muriculate and setulose, the segments palmate, broad (showing quite V-shaped sinuses), widening upwards and doubly lobed, *i. e.* the terminal secondary lobe itself conspicuously 3-lobed, the pair of basal lobes subdivided on the margin next the petiole, producing each a secondary lobe which two, ear-like, approach the petiole somewhat hastately or sagittately: fruiting racemes very large, commonly 6 or 7 inches long, 4 inches across, the area of each exceeding that of the largest leaves: samaras 1¾ inches long, diverging to form by their bases a long quadrate sinus, the whole body very hirsute, but shortly so, also tomentose underneath the hairs, the broad wings nearly glabrous.

Tree of Napa Valley and its immediately tributary wooded cañons, first collected by Brewer, on the State Survey (n. 1316), later by Pringle (25 Aug. 1882) at Calistoga at the head of the valley. The leaves of the species are of only a fourth or a third the size of *A. macrophyllum*, and extremely unlike them

in all particulars of specific character, while the fruit-clusters are the largest in the genus, far surpassing those of the great-leaved Oregonian tree. I should hold as typical of the species the specimens of Brewer, U. S. Herb. sheets 321447 and 321448. The Calistoga tree of Pringle, U. S. Herb, sheet 17948, differs somewhat, its racemes being distinctly pendulous in fruit, and the samaras are rather smaller.

ACER STELLATUM. Leaves small, the largest 4 inches wide and as long, those of the flowering twigs even smaller, the 5 lobes somewhat stellately radiating, lanceolate, acuminate and entire in the floral twigs, in the others widening upwards and 3-lobed at apex, the upper face of all leaves glaucescent-green and minutely setulose-roughened, the lower light-green, finely reticulate, very minutely if at all roughened with hair-points: racemes short, few flowered; samaras 1½ inches long, suberect, the broad wings nearly meeting.

Cache Creek Cañon, Yolo Co., 8 May, 1903, C. F. Baker, his n. 2981 as in U. S. Herb., distributed with the printed note: "A small tree common along cañon walls and in adjacent gulches. Quite different in appearance from the form of the redwood districts."

ACER HEMIONITIS. Branches of the season green, glaucous, those of the preceding two years still green-barked, but without bloom: leaves not large, 4 or 5 inches long, of about the same breadth in the middle, palmately 5-parted, the sinuses rather narrowly and acutely V-shaped, the 3 principal segments subrhomboid-lanceolate, neither toothed nor yet entire, the margin only repand or wavy, the basal segments of the 5 small, nearly or quite entire, upper face of leaf sparsely muriculate within the meshes of the reticulation, and with very few bristly short hairs on the veinlets, the lower face only minutely and somewhat granulately roughened, the ciliation of the segments light and inconspicuous: samaras only 1 inch long, the body sparsely long-setose, and with an obscure yet

dense short indument under the bristles, the wing appressed-setulose throughout.

Tassajara Hot Springs, Monterey Co., 1 June, 1901, A. D. E. Elmer, his n. 3179 as in U. S. Herb., sheet 416370. Species of peculiar foliage closely simulating that of the fern *Hemionitis palmata* both as to size and form. The samaras, hardly larger than those of the eastern sugar maple, are of barely one-third the size of those of *A. macrophyllum*.

ACER DACTYLOPHYLLUM. Leaves 4 to 6 inches long, 6 to 8 inches wide by even the basal lobes, the whole digitately cleft into 5 not very unequal entire lanceolate lobes; upper face of leaf vivid green and polished, under a lens sparsely and minutely setulose, but the mid-vein quite hirsute, lower face with only a few setulae and these on the veinlets only, the ciliation of the lobes little pronounced: samaras little over an inch long, erect, their wings meeting in the middle, thus enclosing an inversely triangular-lanceolate sinus.

Species known to me in but a single branch sent me long ago by Mr. Parish, from San Bernardino Mountains, gathered in very mature leaf and well grown fruit 1 March, 1888. The type specimen is n. 11419 of my own herbarium; but there was sent along with it, and under the same label, but with date 29 June, a totally different thing, in mature fruit, and with the palmately lobed leaves of most maples of America. The leaves of *A. dactylophyllum*, as to their pattern, are unique in the genus. Their circumscription across the base, and then around from tip to tip of the five subequal segments, is almost exactly semicircular, and they are as nearly pointing forward, finger-like, as five segments of any such semi-circular figure may be.

ACER LEPTODACTYLON. Leaves large and long-petioled, the petioles 4 to 7 inches long, measurement of blade 5 to 8 inches lengthwise, 7 to 10 inches crosswise from tip to tip of the largest pair of segments, the whole 5-parted into lanceolate well tapering yet not quite acute segments either quite entire

or merely undulate marginally or with a few slight sinuate lobes, the whole of a vivid green on both faces but deeper above, the petiole and the veins of both faces villous-puberulent, the axils of midvein and veinlets with conspicuous villous tufts, both faces otherwise softly and shortly setulose: fruiting raceme large, erect, the rachis and pedicels villous-puberulent; samaras small for the foliage, barely 1¼ inches long, more divergent than usual, the sinus broad and quadrate below, body densely villous-setose (if not better called soft-hirsute), wings very broad (½ inch), minutely puberulent.

This is another very strikingly marked species of southern California, and large-leaved even, but the foliage cut almost to the base into long narrow five-finger-like mostly entire segments. The locality is the Sulphur Mountains of Ventura Co., the collectors Abrams & McGregor, June, 1908; type on U. S. Herb. sheet 612966.

Acer politum. Leaves about 5½ inches long and a trifle broader above the middle, deeply 5-cleft, the sinuses narrowly and not acutely V-shaped, 3 larger lobes widening upwards and coarsely and unevenly toothed, the two basal divaricate-spreading, entire on the upper margin, sinnate-toothed on the lower, the base of the leaf as a whole nearly truncate, texture subcoriaceous, both faces glabrous and somewhat polished, even the usual ciliation wholly wanting: samaras only 1¼ inches long but the wings more than ½ inch wide, slightly overlapping, very strongly transverse-striate and glabrous, the nutlets short-bristly, with little or no other indument.

Along Johnson's Creek back of Fort Tejon, Kern Co., 6 July, 1891, Coville & Funston, n. 1166; type on U. S. Herb. sheet 17945.

Certain Western Roses.

The original definition of *Rosa gymnocarpa* given by Nuttall, while loose enough easily to include a number of species is, on the other hand, such a diagnosis as effectually excludes a great

number of gymnocarpous kinds which, obviously distinct, have found place in the herbaria under the name *R. gymnocarpa*, yet only so because of hasty and superficial glances at the fruits alone.

In proposing the following segregates, I have left untouched all the Columbia River region material. This is Nuttall's original locality; and all that is in those seaward parts of Oregon and Washington may or may not be referable to true *R. gymnocarpa;* but all the new segregates are from parts of eastern and arid regions where Nuttall never traveled, at least as regards Oregonian and Washingtonian shrubs, while the more considerable number of Californian segregates are, in another way, as completely isolated not only from the true Oregonian type but from each other; and they will be found invested with diagnostic characters more pronounced than most of the published species of *Rosa* have to show.

ROSA GLAUCODERMIS. Bark of old branches ashy gray, of the younger and growing ones green and glaucous, rather well armed with prickles not stout, and all ascending rather than spreading: leaves rather large for the group, and lax, leaflets very distinctly petiolulate, usually 7, rarely 9, oval to obovate, with a shortly cuneate tapering to the base, sharply and doubly serrate, deep-green above, pale beneath, neither face either notably venulose or at all reticulate, glabrous; rachis slender, with very few prickles, the glandular hairs also very sparse and short; stipules broad throughout except as to the rather narrow and very acute lobes: fruit acutish at both ends.

Shasta Springs, Shasta Co., Calif., collected in 1894, by W. L. Jepson, communicated to U. S. Herb., there occupying sheet 480045. One of the characteristically Californian group with green and glaucous branches instead of the glabrous red ones of *R. gymnocarpa;* this the only species yet seen with distinctly petiolulate leaflets.

ROSA CRENULATA. Bark of old branches red-brown, of the younger pale-green, the prickles very few and firm; leaves of

middle size for the group; leaflets approximate, from almost meeting to fairly overlapping, not greatly unequal, all broadly obovate, obtuse, or the small lowest pair subtruncate, crenate rather than serrate, the margins of the crenatures beset with a few stipitate glands in place of secondary teeth, both faces softly but shortly villous-pubescent; rachis with here and there a rigid spine but everywhere pubescent, many of the soft hairs rather stiffer and gland-tipped; stipules very narrow below the middle, above that widened and ending in long divergent lobes, the marginal series of gland-tipped hairs both slender and short; peduncles with very few and short glandular prickles; fruit sub-globose.

Pine Ridge, Fresno County, California, at 5500 feet, collected by Hall & Chandler, June, 1900, their number 171 as in U. S. Herb. Noteworthy for the obtuse rounded indentation of the leaflets, and their soft pubescence.

ROSA PRIONOTA. Stems red-brown, glabrous except as beset with a few rather stout and hard spreading prickles: leaves very small, of 7 to 9 somewhat distant leaflets, these oval, obtuse, deeply and very acutely serrate, the primary serratures almost acuminate, the secondary much reduced, even obscure, both faces of a rather vivid green and glabrous, only the midvein conspicuous, its branches almost obsolete, but both faces under a lens notably reticulate; rachis quite strongly stipitate-glandular but without naked prickles; body of stipules broad, the lobes rather small, acuminate: peduncles short and shortly though somewhat densely glandular-hispid; fruit globose.

Lake County, California, on foot-hills south of Mt. Sanhedrin, 14 July, 1902, A. A. Heller, his n. 5858 as in U. S. Herb., sheet 416864. Remarkable for the deep sharp serrature of the quite extremely small leaflets.

ROSA PISCATORIA. Stems slender, upright, the bark green, very hispid with many short slender spreading or deflexed prickles and a few long stiff spreading ones, these commonly

infrastipular in pairs: leaves long but open, the rachis almost filiform and the small leaflets somewhat remote, always 7, broadly somewhat obovate, all except the terminal one—and this also sometimes—obtuse, doubly serrate, of thin texture, glabrous on both faces, rachis with very few proper prickles and more numerous slender-stiped glands; stipules of the earliest leaves with broad obtusish lobes, those of the later showing lobes acute to subfalcate-acuminate, the margin subserrately glandular: peduncles naked at summit, otherwise sparsely and shortly glandular-bristly.

Pescadero, San Mateo Co., Calif., May, 1903, A. D. E. Elmer. Extremely hispid as to stems, but foliage small and delicate.

ROSA CALVARIA. Shrub rather tall, slender and loosely leafy, the branches of the season only purplish under a coat of bloom, totally naked as to the usual armature of slender spines, these replaced by a pair of long stoutish basally flattened straight spreading infrastipular spines to every leaf: leaves uncommonly long-petioled and lax, of about 7 leaflets, the terminal one well separated from the others by a petiolule of ¾ inch, all rather large, round-obovate, obtuse or even subtruncate, the primary serratures broad, the secondary ones very numerous, both faces of a pallid green as if glaucous, but both densely soft-pubescent; the rachis sparsely hispid and densely puberulent; stipules small and narrow for the group, their lobes not large, triangular-lanceolate: flowers in threes, their peduncles naked, glaucous and even wholly glabrous; fruit not seen.

Collected by the writer, at the Calaveras Big Tree grove in June, 1889; type specimens on sheet 11192 of my herbarium. Leaves and leaflets excessively large for an ally of *R. gymnocarpa*.

ROSA ABIETORUM. Shrub apparently low and straggling, branches of all ages well armed with straight spreading prickles varying much in length: leaves large for the plant, commonly

of 7 leaflets all broad and obtuse, the pairs very unequal, the lowest round-obovate and obtuse or even retuse, of one-third the size of the uppermost pair, these only broadly obovate, all doubly serrate-toothed, deep-green above, pale beneath, somewhat reticulate-venulose on both faces, conspicuously so beneath; stipules of the breadth, and the glandular margin usual in the group, but their lobes narrow and acute, triangular-lanceolate to broadly subulate; peduncles very short, less than 1 inch long, naked and glabrous; fruits ovoid.

Inhabits fir woods of Klamath County, southern Oregon, where it was collected about Lake of the Woods, 25 July, 1897, by Coville & Applegate; type on U. S. Herb. sheet 380319.

ROSA AMPLIFOLIA. Shrub evidently large, bark of branches a year old dull red-brown, very sparsely armed with a few slender ascending prickles, the flowering twigs of the season with similar very sparse armature, but augmented by 1 to 3 infra-stipular spines: leaves very large for the group, of 7 not very unequal leaflets, all thin, rather deep-green above, glaucous beneath, but the feather-veins neither at all elevated nor whitened, but branching to form a manifest though faint reticulation, the pairs quite approximate, the outline oval and oval-elliptic, doubly serrate, the serratures not deep but salient; rachis unusually naked, the prickles and stalked glands very sparse and small; stipules small in proportion to the leaves: peduncles short, loosely glandular-hispid: fruit not seen.

Margin of Fish Lake, in the mountains of Jackson County, southern Oregon, at an altitude of 5,000 ft., collected by E. I. Applegate, 18 June, 1898; type on sheet 381523, U. S. Herb. The leaves are so very large, and have so much of the color, texture and pattern of those of *R. acicularis* that but for the small solitary flowers this would have passed readily with many for that species.

ROSA LEUCOPSIS. Shrub not small, the bark of growths of two seasons equally pale-green, unarmed except as to the

presence here and there, at the base of a stipule, of two small straight spines: leaves very large for the group, of commonly 5, as often 7 leaflets, these very thin, glabrous, pale glaucous green above and almost white beneath, here with rather elevated white feather-veins but no reticulation, the outline obovate or oval, not deeply yet somewhat doubly serrate-toothed; rachis slender, white, beset with here and there a small spine and more freely stipitate-glandular; stipules not very broad below, but the large triangular lobes of an area often equalling or exceeding that of the body: peduncles rather long, minutely but not sparsely glandular-hispid; fruit round-pyriform, orange-colored.

Sage plains of southeastern Oregon, in Lake County, collected 29 Sept., 1896, by H. E. Brown; type on U. S. Herb. sheet 283078, the collector's number being 99. Remarkable for the whitish pallor of both stems and foliage, as well as for the total absence of general armature.

Rosa Helleri. Shrub stoutish, evidently tall, the dark red-brown bark softly prickly, the slender armature ascending: leaves rather ample yet compact, the commonly 9 leaflets approximate, even occasionally overlapping, of a pale glaucous-green, of oval to oval-elliptic outline, simply serrate toward the base, otherwise doubly so, both faces glabrous, neither one any more than very faintly reticulate; stipules large and broad; peduncles 1 inch long, shortly but rather densely glandular-hispid.

About Lake Waha, Nez Perces Co., Idaho, A. A. Heller, 25 June, 1896; type on U. S. Herb. sheet 267361. By the aspect of its foliage, with long pale almost crowded leaflets, this shrub at first glance seems more like the eastern so-called *R. blanda* than like *R. gymnocarpa*, and only a careful inspection with a lens brings the assurance that it is of this western small-flowered group.

Rosa apiculata. Stems slender but rigid and upright, armed not sparsely with prickles partly long, stiff and ascend-

ing and partly short, slender and spreading or deflexed: leaves very small, the leaflets commonly 7, oval, obtuse, doubly serrate, glabrous on both faces and obscurely reticulate, rachis with here and there a stout prickle and many stipitate glands; stipules broad, ending in acutely triangular lobes, the whole margin beset closely with unusually long-stalked glands: peduncles short, stiff and straight under the fruits, densely beset with gland-tipped prickles or bristles which are of unequal length but none long: fruit elongated, fully twice as long as broad, and ending in a narrow neck-like apiculation.

Collected on Whidbey Island, in Pugets Sound, near Coupeville, July, 1899, by De Alton Saunders; type on sheet 364810, U. S. Herb.

ROSA DASYPODA. Stems armed with long straight slender slightly ascending prickles: leaflets mostly 5, occasionally 7, the terminal one and the pair next it oval, obtuse, the small lowest pair nearly orbicular, all doubly serrate, both faces glabrous, the lower pale, not reticulate, the rachis of the leaf beset with very few prickles and many short-stipitate glands; stipules broad, ending in ovate acute lobes, glabrous except marginally, there closely beset with a series of shortly stipitate glands: fruit globose or depressed-globose, the fruiting peduncle straight, closely beset with stout straight prickles strongly gland-tipped.

Bear Creek, Wallowa Co., Oregon, at 3850 feet, E. P. Sheldon, 28 Aug., 1897, who reports that it is a bush three or four feet high, occurring in open woods along streams. Type sheet U. S. Herb. 528469.

ROSA ADENOCARPA. Dwarf and almost wholly herbaceous, simple and upright above the almost entirely subterranean woody part, only 4 to 7 inches high, with about 4 leaves and 1 to 3 terminal small flowers; stem slender, wholly glabrous and unarmed, or in a few with here and there a short stout straight prickle: leaflets 5, rarely 7, very unequal, very broadly obovate to nearly orbicular, petiolulate, coarsely, incisely and somewhat doubly serrate, apparently glabrous, but with a trace of clamminess; rachis and petiolules destitute of prickles, but quite densely glandular-villous; stipules not very broad, their lobes subulate and strongly glandular-serrulate: fruit quite strongly armed with gland-tipped prickles.

Singular species, despite all its peculiar characteristics, a genuine member of this gymnocarpous group, known only as collected on Mount Grayback in southwestern Oregon, 15 June, 1904, by C. V. Piper; type sheet of five specimens in U. S. Herb. n. 527765.

The roses allied closely to *R. gymnocarpa* are not all gymnocarpous. Among species showing persistent sepals are the next following:

ROSA BOLANDRI. Shrub evidently low and rather diffusely branched, the branches and even the branchlets strongly and even doubly armed, showing long stoutish spreading or even slightly infrastipular spines and plenty of intervening slender prickles of several sizes, most of these slightly ascending: leaves and leaflets small, the latter 5 to 7, from round-obovate in the very small lowest pair, to oval in the others, acutely and almost simply serrate all around; rachis with a few stout prickles and many short-stalked glands; stipules small for the group, but the margin bordered strongly with the usual gland-tipped ciliation: pedicels very short, sparsely glandular-hispid: mature fruit very large for the group, oval, crowned with all the sepals as persistent.

Known only as by H. N. Bolander, at some unrecorded

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station among the Oakland Hills, this more than fifty years since, and evidently not distributed; probably an unique specimen. This has been in the hands of M. Crépin, whose remark (in sched.) is that it may be abnormal. He has not observed those other characters by which this would claim specific rank even were it gymnocarpous.

ROSA BREWERI. Low, rigidly branching, the bark green on old twigs as on young, the armature diversified, some prickles very stout, short, recurved, others as stout, long, straight, slender-pointed, smaller and more bristly ones numerous: leaflets 5 to 7, smallish, obovate, obtuse, doubly serrate, densely and somewhat strigosely pubescent on both faces; rachis with one or more stout straight prickles and numerous short-stalked glands; stipules neither large nor notably glandular: peduncles solitary, short, stout, glandular-hispid: fruit very large, round-ovoid, glaucescent, crowned with sepals externally glandular-hispid and strigulose.

Collected on the Calif. Geol. Survey fifty years since, by W. H. Brewer, near San José, 30 August, in very ripe fruit.

ROSA GRANULATA. Low, slender, the bark green, the scattered larger spines long, rather slender, more or less curved or deflexed, the smallest straight, spreading, often gland-tipped: leaves not small, of 5 leaflets, these oval or obovate, acutely and doubly serrate, almost alike green on both faces, with a trace of pubescence as well as a pronounced roughness that is between muriculate and granular, on younger leaves rather granular than otherwise, this indument chiefly of the lower face; rachis very rough with small subsessile glands: flowers solitary, their short pedicels and also the ovaries glandular-prickly: fruit not known.

Like the last, collected by Brewer, somewhere near San Luis Obispo, Calif., in April, 1861. Perhaps akin to *R. gratissima*.

ROSA COVILLEI. Evidently low, perhaps seldom a foot high; bark rather pale, glaucescent, beset with rather slender spines of several lengths but all spreading and straight: leaf-

lets quite constantly 7, very unequal, all obovate, or the odd one oval, acutely and simply serrate, deep-green and glabrous above, beneath paler and puberulent without glands; rachis destitute of prickles and with very few small glands, but pubescent; stipules not large, loosely glandular-ciliate: flowers solitary, peduncle short, glabrous; fruit very large for the group, round-ovoid, retaining to the last its crown of sepals.

Yellow pine forests, south of Naylor, Klamath Co., Oregon, 22 Sept., 1902, F. V. Coville.

Rosa myriadena. Apparently low, the branches not slender, rigid, divergent, unarmed except by quite constant, usually paired, infrastipular spines, these long, stout, manifestly curved: leaflets constantly 5, oval, obtuse or acutish, doubly serrulate, green, glabrous and smooth above, very pale beneath as if glaucous, but this face, under a lens, reticulate-venulose, puberulent, the rather prominent midvein and veinlets beset with many small subsessile reddish glands; rachis with a few short gland-tipped prickles, also dark with the multitude of red glands; stipules, as in the group, large, strongly glandular not only marginally but superficially on the outside: flowers 1 to 3 terminating the branchlets; peduncles naked and glabrous; sepals glandular-prickly both marginally and on the outside: young fruits globose.

Huckleberry Mountain, Jackson Co., Oregon, 2 Aug., 1897, Coville and Applegate; type on U. S. Herb. sheet 380588. No fruits are mature, yet doubtless the calyx leaves are persistent.

Rosa muriculata. Stout, probably tall, the bark green, glabrous, bearing a pair of stout but not long spreading or ascending infrastipular prickles only, the flowering twigs wholly unarmed: leaves rather small, of 5 or 7 leaflets, these broadly ovate, the terminal rather obovate, none acute, the serrature mostly double, both faces almost equally green, the upper glabrous, the lower sparsely muriculate with callous white points which at first bear a small pellucid gland, this

deciduous; rachis with a number of rather strong prickles and many small glands mostly subsessile; stipules broad and large, but the lobes rather short and blunt, the whole margin very glandular: flowers in threes, or solitary; peduncles stout, rather softly somewhat glandular-prickly; fruits of medium size, rather depressed-globose, the persistent sepals glandular-muricate.

Near Woodland, Cowlitz County, Washington, F. V. Coville, 15 July, 1898. The shrub has every appearance and character of this *R. Sonomensis* section of the gymnocarpous group.

ROSA WALPOLEANA. Shrub probably large, but only flowering twigs known, these with green bark and short stout strongly curved prickles, these 2 to each internode, well separated and neither evidently quite infrastipular, the upper part of the twig and next the peduncles bristly-hispid: leaves large, of 7 to 11 large approximate round-obovate leaflets, these very obtuse, sharply serrate, the secondary serratures nearly obsolete, represented by small stalked glands, both faces of a vivid green, the upper with a trace of setulose hairiness, the lower conspicuously glandular-muriculate: rachis with quite an array of whitish curved prickles and many small gland-tipped bristles; stipules very large, with large acute lobes and the usual ciliation: flowers in threes, large, their short stout peduncles and also the ovaries very hispid: fruits large, subglobose to short-oval, very hispid, likewise the exterior of the persistent sepals.

Ashland, Oregon, 9 Sept., 1899, F. A. Walpole; specimens in U. S. Herb., sheets 401173 and 401286.

The following belong to groups of roses far removed from that of the gymnocarps.

ROSA COPELANDI. Shrub tall, the stems slender, glabrous, reddish and unarmed except by pairs of infrastipular spines, but these stout, not long, slightly recurved, whitish throughout, the greatly elongated and narrow base equalling the

length of the spine: leaves of a vivid green, wholly glabrous, mostly of 5 leaflets, sometimes 7; leaflets mostly elliptic-oval, acutish, simply and sharply serrate; rachis with here and there a stout spine each one as if stipular to a pair of leaflets; stipules remarkably ample for the foliage, the large lobes often equalling and sometimes quite surpassing the area of the body, the whole organ glabrous, glandless, entire: flowers 1, 2 or 3 terminating the twigs: fruits subglobose, in maturity retaining the calyx upright.

Mount Eddy, Siskiyon Co., Calif., at 4800 ft., collected 8 Sept., 1903, by E. B. Copeland, distributed by C. F. Baker (n. 3875); type in my herbarium, n. 11152.

ROSA DELITESCENS. Size of the last, the red of the stems and branches obscured by a coat of bluish bloom, the green of the foliage similarly pallid; armature infrastipular only, as often of a solitary spine as of a pair of them, these both stout and long as well as with downward curvature: leaves of 7, rarely 5 or 9 leaflets, these oval, obtuse, somewhat doubly serrate, glabrous above, beneath showing a distinct muriculation along the veinlets and elsewhere; rachis with not a few short prickles and many small not sessile glands; stipules small and narrow, glandular marginally: mature fruits large, short-ovoid or subglobose, the persistent sepals strongly glandular-hispidulous, some longer gland-tipped spines scattered over the summit of the fruit.

Collected only by the writer, on the Siskiyon Mountains, but within the Oregon boundary, 3 Sept., 1889; type specimens Herb. Propr. 11146.

ROSA ANACANTHA. All parts of the shrub, even the most vigorous shoots, unarmed; bark red or purplish, rendered pale by a coat of bloom while young, older branches devoid of it, and with the bark of the cinnamon roses: leaves of 5 to 7 leaflets, the pairs approximate, texture firm, outline oval, margin crenate rather than serrate, both faces pale and dull, the upper sparsely puberulent, the lower cinereously puberu-

lent between the veins, more densely and villously so on the veins; rachis with the same indument, showing here and there a small stout prickle near the insertion of the leaflets; stipules small, velvety-puberulent, glandless and entire marginally: fruits corymbose, subglobose, glabrous, glaucous, crowned with the persistent villous sepals, these erect and even connivent.

This also is known to me only as collected by myself while on my extensive journeyings in the Northwest in the summer and autumn of 1889. On the whole journey I gave close attention to the roses, making specimens as perfect as possible. *R. anacantha* was obtained at Takoma, Washington, 24 Aug., 1889. Its habitat was along the borders of thickets near the salt marshes, at a point not then far out of town. Type sheet Herb. Propr. 11113.

Three New Rhamni.

RHAMNUS BLUMERI. Small tree of the *Frangula* group, with subcoriaceous foliage and only tardily deciduous; growing twigs canescently velvety-tomentulose, even the older branchlets grayish with the same indument still persistent: leaves mostly round-oval, 1½ to 2¼ inches long, 1 to 1½ inches broad, obtuse at both ends, or with a short blunt apical cusp, nearly entire, the teeth both small and obscure, lower face more or less pale with fine tomentellous indument, the upper green, scaberulous-looking under a lens, yet soft to the touch: berries globose, black; seeds 2, exactly orbicular, low-hemispherical, olive-green.

Collected in the Chiricahui Mountains, southern Arizona, at 5300 feet, 28 Aug., 1906, by J. C. Blumer; his n. 1290 as in U. S. Herb. The seeds appear to be constantly two only, of course by abortion of one ovule; and they are circular in periphery, as well as quite perfectly plano-convex. The small tree has no intimate connection, either geographically or phy-

tologically with the entirely distinct *R. tomentella* of middle and northern California.

RHAMNUS ELLIPSOIDEA. Leafy and fruiting branches of the season light-green, and, with the leaves, devoid of all tomentellous indument, merely hirtellous and thinly so: leaves elliptical, 3 inches long, 1½ inches wide, of thin texture, finely serrulate, conspicuously feather-veined beneath and the veins hirsutulous: fruits low-pyriform, black, 3-seeded; seeds of obovate outline, convex dorsally, ventrally in a manner angular, the suture being elevated, the color dark brown.

San José Mountains, Sonora, but near the U. S. boundary, 3 Aug., 1893, Edgar A. Mearns. Type on U. S. Herb. sheet 231267. Allied to *R. Purshiana*, but far isolated from the habitat of that species, and strongly differentiated. It may be looked for within some mountainous districts of extreme southwestern Arizona.

RHAMNUS CONFINIS. Young branches with some tomentulose indument, those of a year old glabrate and reddish: leaves oval to lance-oval, the more strictly oval ones 3 inches long and 2 in breadth and very obtuse, others longer, narrower and more or less definitely cuspidate, all thinnish, distinctly serrulate, green but under a lens puberulent above, beneath hirtellous along the veins and more obscurely pubescent between them; fruits not mature, but plainly 3-seeded.

Cajon Creek, Chihuahua, Mex., near the boundary line, E. A. Mearns, 2 July, 1892; type in U. S. Herb. sheet 260274.

A Handful of Vetches.

VICIA PERANGUSTA. Stems very slender, a foot high or more, quadrangular by very prominent obtuse callous angles, glaucous-green: leaflets 10, narrowly linear, 1½ inches long,

obtuse at both ends but prominently mucronate, alternate on a filiform rachis ending in a branched and well developed tendril; stipules of lower leaves semisagittate, the lobe with a few subulate teeth, the main part entire, of middle leaves narrowly lunate, very acute and entire, the lobe of about equal length with the main part, whole plant glabrous to the naked eye, but a scattered villous hairiness visible under a lens, chiefly along the rachis and about the stipules: racemes not equalling the foliage, about 5-flowered, the flowers ¾ inch long, narrow, purple.

Var. LATIUSCULA. Leaves only ½ inch long, oblong-linear and even oblong, subtruncate, mucronate; flowers fewer in the raceme, only ½ inch long.

From an elevation of 7500 feet in the mountains of middle Arizona, 16 June, 1912, A. D. Read; the type and the variety growing together, even with intermediates, but all alike as to color, texture and indument of herbage.

VICIA HYPOLASIA. Stature and habit of the last, leaflets also 10, but more crowded on their rachis, ½ inch long or very little more, lance-oblong, obtuse, only minutely mucronate, of a rather vivid green and thinnish texture, under a lens notably feather-veiny on both faces, glabrous above, not very sparsely villous-hairy beneath, more especially towards the midvein: racemes quite surpassing the leaves, 4-flowered; corolla more than ½ inch long, narrow only below the strongly developed and suberect banner, the wing petals unusually short: pods little more than 1 inch long, tapering to both ends, about 3-seeded, transversely flexuous-veiny.

Chiricahui Mountains, Arizona, 1 Sept., 1906, J. C. Blumer, collected in pine lands at 8000 feet, distributed for *V. Americana*.

VICIA ACICULARIS. Stems slender yet rigid, though tortuous and not self-sustaining, a foot high or more, the angles acute, color of herbage pale glaucous-green, nearly or quite glabrous: leaves of about 10 leaflets 1½ to 2 inches long, very narrowly linear, narrowed gradually to a still more narrow and

acute almost needle-pointed apex; rachis as narrow, ending in a branched tendril; stipules very narrowly semisagittate, the body entire, very acutely subulate, the basal lobe shorter, with 2 or more subulate teeth, a separate subulate lobe standing out divaricately from between the body and the basal lobe: flowers 1 to 4 at summit of the long rigid peduncle; lower calyx-teeth subulate, all rigid; corolla ¾ inch long, the banner more than usually elongated, but ascending, not erect: pods elliptic and 1-seeded, or more elongated and 2–3-seeded, the valves very firm, transversely lineate or even more or less reticulate.

Western part of Klickitat Co., Washington, near the Columbia River, May, 1891, W. N. Suksdorf, who distributed it for the very different, and also geographically remote *Lathyrus linearis*, Nutt. The stiff needle-like foliage, the general rigidity of texture, and, what is no more than equal significance with the texture, the peculiarly elongate banner, place this in the rank of an indisputable species.

VICIA CALLIANTHEMA. Low perennial, upright, only 4 to 7 inches high, densely leafy, the internode of only ⅓ the length of the leaf, herbage pale as with bloom, also rather sparsely somewhat villous-strigose: leaflets about 8, linear, hardly acute, firm, 1 to 1¼ inches long, the rachis ending in a simple though not short tendril: peduncles short, about 3-flowered, the flowers crowded at the end of the peduncle: calyx thin, even subscarious and tinged with purple from about the middle, all the teeth deltoid and short; corolla nearly an inch long, the greatly enlarged banner petal nearly ½ inch wide and of greater length.

Bitter Creek, Wyoming, 2 June, 1897, collected by Prof. A. Nelson, and by him distributed for that Californian and widely different plant which Nuttall published as *Lathyrus linearis*.

VICIA VEXILLARIS. Plants 7 to 10 inches high, slender, upright, the herbage wholly glabrous, not in the least glaucous but of a rather vivid light green, the leaflets so thin as to be translucent and as it were almost fenestrate; each leaf of

about 6 leaflets, ½ inch long or more, oblong-elliptic to obovate-oblong, mucronulate-acute at the otherwise blunt apex, leaf rachis firm, ending a short usually simple tendril: peduncle 1–3-flowered; calyx thin, showing now and then a few scattered hairs, the teeth passing from deltoid in the shorter to subulate in the longer: corolla ¾ inch long, but a full ½ inch wide across the banner, this therefore excessively enlarged, but only ascending, the sides somewhat reflexed.

Big Horn County, Wyoming, I. T. Worthley, 1896, also sent out for *Vicia linearis* (Nutt.) Greene.

Miscellaneous Specific Types—VI.

TALINUM VALIDULUM. Slenderly fusiform or subcylindric fleshy root 4 to 6 inches long surmounted by one or more thick caudex-like jointed and in age even knotted branches an inch long, these bearing annually one or more short compact leafy branches and a few-flowered cyme 1 or 2 inches long: leaves ½ inch long, linear, acute, apparently subterete: flowers 1 to 5 in each cyme: corolla large for the group, light rose-red: stamens 10; filaments short, slenderly subulate; anthers yellow: seeds unknown.

Collected on the Tusayan Forest Reservation, Arizona, 11 July, 1912, by R. R. Hill. Of the group of *Phemeranthi*, but dwarf and very stout; the whole plant above ground not more than two inches high.

TALINUM MARGINATUM. A caulescent dwarf, the tuft of leaves and inflorescences barely 2 inches high above ground, or in very fair specimens only 1 inch; root very short and almost tuberiform, oval or shorter: leaves neither terete nor even linear, being oblanceolate-spatulate and obtuse, much flattened and adorned with a narrow but very distinct scarious margin: cymes scarcely equalling the leaves, few-flowered; corolla yellow: seeds dull, round-subreniform, marked with several concentric subcircular lines.

Sierra Madre, near Santa Teresa, Tepic, Mexico, 12 Aug., 1897, collected by J. N. Rose. The plant is related to *T.*

humili and *Greenmanianum*, but differs greatly from both in that the foliage is not linear and terete but flat, and scarious-margined. The specimens are on U. S. Herb. sheet 301135.

CLAYTONIA CHENOPODINA. A caulescent perennial, the several leaves and scapes of equal length and about 3 inches high, arising from a fascicle of several rather thick and fleshy roots: leaves from subhastate-ovate in the earlier, to ovate without basal angularity in those next the scapes: bracts of the involucre ovate, sessile as it were at summit of scapes, the subumbellate cluster of flowers as if sessile within the involucre and barely equalling it: corolla of the size and form of those of typical *Claytonia* and pinkish: seeds not seen.

Mono County, California, at 10,500 feet in the mountains, growing in volcanic scoriae, collected 4 Aug., 1912, by Messrs. Hatton and Maule, in the Forest Service there. The plant is very fleshy, and as a species is strongly characterized by its fleshy and fascicled roots and the chenopodiaceous cut of its main foliage.

TRIDOPHYLLUM ACHEMILLACEUM. Biennial, more than a foot high, parted from near the base, and somewhat dichotomously, into numerous slender upright cymosely panicled branches: basal leaves on slender petioles 1½ to 3 inches long, leaflets 3, closely approximate, the terminal obovate, the laterals gibbously round-obovate, all coarsely crenate-serrate, sparsely and minutely pubescent above, the lower face and petioles villous and viscid; leaves of flowering branches smaller, cuneate-obovate, entire below the middle, all the axils bearing both a solitary rather long-pedicelled flower and a much longer suberect floriferous branch, all branches and branchlets polished and straw-colored at first view, under a lens seen to be viscid: flowers very small, no petals seen; segments of calyx deltoid-ovate, bractlets narrow, elliptical, yet nearly equalling the segments: achenes minute, subreniform-oval, smooth, whitish.

Collected by the writer at Golconda, Nevada, 28 July, 1896; type specimens in my herbarium, sheets 11770 and 11771.

Basal leaves described from plants of the first year, these all dying and disappearing before the flowering and fruiting the next year. This is the most slender member of the genus, very freely branching and copiously flowering, but the long branches suberect, and the general aspect is much that of certain species of *Alchemilla*.

TRIDOPHYLLUM DECANDRUM. Biennial, a foot high, rather slender, parted only above the middle into short and more or less widely divergent cymosely floriferous branches, both stem and branches reddish or dull, not polished but viscidly villous: leaflets 3, all cuneate-obovate, of thin texture, only the upper part serrate, both faces with sparse appressed hairs: calyx with triangular-lanceolate acute segments and lanceolate obtuse bractlets: stamens 10: petals narrow, obovate-oblong, pale yellow: achenes short and thick, almost semiorbicular, white but dull.

Palisade, Nevada, collected by the writer 24 July, 1893; type sheet in his own herbarium, n. 11766.

SISYRINCHIUM JUNCELLUM. Plant rather low and rigid, the mature fruiting plants only 8 inches high, the flowering ones less than 5 inches, the leaves of little more than half the height of the scapes, narrow, somewhat ensiform, about 6-striate-nerved, glabrous: scapes of barely the width of the narrow leaves, narrowly herbaceous-winged; outer bract of the spathe barely equalling the pedicels of the flowers, narrowed and rigid: ovary, and even the summit of pedicel, as well as also the base of the perianth, more or less hirtellous-hairy; segments of deep blue perianth alternately subtruncate and merely obtuse, in either case ending in a triangular-subulate cusp, also more or less definitely ciliate across the summit with a few hairs: capsule subglobose, sparsely hairy.

Collected 3 Aug., 1911, in a marsh at 9100 feet, in the Gunnison National Forest, Colorado, by William H. Mast; type specimens in U. S. Herb. A strongly marked subalpine species, with short foliage and a peculiarly reedy aspect, though of a pale-green herbage.

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